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# USSR Report

NATIONAL ECONOMY

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USSR REPORT  
NATIONAL ECONOMY

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## ECONOMIC POLICY, ORGANIZATION, MANAGEMENT

### BACHURIN URGES UPGRADING OF PRODUCTION, ECONOMIC STRUCTURE

Moscow PLANOVYE KHOZYAYSTVO in Russian No 9, Sep 86 pp 86-94

[Article by A. Bachurin, doctor of economic sciences, professor: "Qualitative Changes in the Productive Forces and the Economic Sciences"]

[Text] The 27th CPSU Congress has defined an elaborate program of actions to carry out the scientifically sound conception of acceleration of the country's socioeconomic development. It has been substantiated in the decisions of the June (1986) Plenum of the CPSU Central Committee. The principal means of performing this strategic task represent a radical transformation of the productive forces of society on the basis of widespread application of the advances of scientific-technical progress. The transition to an economy with a higher level of organization and efficiency, along with comprehensively developed productive forces, will be accomplished on the basis of a sharp change of direction toward intensification, improvement of product quality and the efficiency of social production, and a consistent deepening of these processes.

#### I

Socialism guarantees a high level of planned socialization of production on the basis of social ownership of the means of production and the transformation of labor into directly social labor. The productive forces and production relations comprise two aspects of social production, the first of which are the most mobile and revolutionary side. People with certain knowledge, production know-how, and work skills constitute the most important productive force. The means of production and above all the implements of labor are productive forces that are created and used by people. In the context of socialist socioeconomic relations, the more knowledge they have, the more diverse their work skills, and the more extensively their progressive know-how is used, the higher the level of development of the productive forces of society.

The uninterrupted growth of the productive forces creates the material conditions for improvement of production relations and of their specific forms that constitute the system whereby economic activity is conducted. A particular place is taken here by social ownership of the means of production in its two forms and the collective character of labor and forms of the organization of work it imposes, by a rise in the productivity of labor, by the methods of economic planning for management and stimulation of the conservation of

resources and production efficiency. This relationship is greatly intensified by the comprehensive intensification of production.

The observation was made at the 27th congress: "The forms of the production relations, the system for the conduct of economic activity and the exercise of management, which are now in place took shape by and large under the conditions of extensive economic development. They have gradually become outdated and have begun to lose their stimulative role, and in some respects they have become an impediment."<sup>1</sup> One of the reasons for this is that theory and practice have underestimated the need for constant improvement of production relations, a need which arises out of the dialectics of interrelationships between the productive forces and production relations, the need for a substantial improvement of the latter, including the forms of ownership, relations in distribution, and commodity-money relations. In actuality, as pointed out in the policy report of the CPSU Central Committee to the 27th party congress, "the present situation" throughout the entire system of management of the economy "is such that confinement to partial improvements is impossible, a radical reform is indispensable. The point is to subordinate our entire production to the needs of society and to satisfaction of people's needs in actual fact, to direct management toward improvement of efficiency and quality, toward acceleration of scientific-technical progress, and toward development of the interest of the workers in the results of labor, of initiative and socialist enterprise in every unit of the economy, and above all in work collectives."<sup>2</sup>

The need to create an entire new system of management and economic activity is dictated by the very course of development and of the qualitative transformation of the productive forces, by revolutionary changes in the technology of production and correspondingly in its organization and economics. In many cases the solution to major scientific-technical problems extends outside the limits of individual sectors, ministries, and departments and comes into contradiction with the existing forms of organization and management of production. The augmented scale of production and the dynamic character of its development in the context of the acceleration of scientific-technical progress and more rapid renewal of the products produced dictate an essential need on the one hand for increasing the effectiveness of centralized guidance of the economy and on the other for expansion of the initiative and independence of the basic unit of material production, for enhancement of its role and responsibility in improving the quality of work and the final results of economic activity. The work collective is being given a larger role in the technical improvement of production and in efficient utilization of the means and subjects of labor.

The productivity of labor needs to be raised substantially and taken to a higher level in order to guarantee a high level of prosperity and harmonious development for the Soviet people. This necessitates transformation of the productive forces on a truly revolutionary basis and reequipping all sectors of the economy on a fundamentally new technical base. This process must be carried out systematically, since science and technology are developing continuously, and the economy must be given the efficiency that comes from applying new technologies. This represents the principal potential for speeding up socioeconomic development. The second most important potential which society

possesses lies in improvement of production relations, in the full and consistent realization of the advantages of socialism.

Over the next 15 years plans call for doubling the size of the national income, which means achieving a substantial acceleration of its growth rate even during the 12th Five-Year Plan and accomplishing an average annual growth of at least 5 percent over the 10 years that follow. When we realize that the productivity of social labor must be raised 2.3-2.5-fold by the year 2000 (and consequently will exceed the growth rates of the national income), the immense political and economic importance of the course adopted toward radical acceleration of scientific-technical progress, which is the principal factor in the rise of the productivity of live labor and conservation of material resources, becomes clear. During the period that lies ahead, in accordance with the Basic Directions for the Economic and Social Development of the USSR Over the Period of 1986-1990 and up to the Year 2000, qualitative changes will take place in the principal productive force--man, brought about by economic laws, above all the basic economic law.

These processes are based on development of the means of production, on changes in the productive forces taking place in the context of the present-day technical revolution. Its most important direction is widespread application of electronics combined with industrial technology in all sectors of the economy. In addition, such new technologies as lasers, radiation, plasma, and biotechnology are experiencing development and are bringing profound revolutionary changes in use of the productive forces and are strengthening the impact of the intensive factors of economic growth.

The advantages of intensive development of socialist production lie in a substantial reduction of costs per unit output and in achievement of the growth of the national income by virtue of extensive application of highly productive implements of labor and application of other efficient means of economic growth. Under those conditions the rate of growth of the final product (national income) exceeds the growth of the total volume of resources employed in production.

Improvement of product quality, which makes it possible to satisfy the needs of society more fully and at lower social cost, is taking on great importance in the intensification of the economy. In short, the intensive strategy for the development of social production is the way to increase its socioeconomic effectiveness and to improve the quality of every effort and of the product produced. It is bound up with improvement of the qualifications of those who work, with development of the creative character of labor, and with a substantial invigoration of the human factor in technical improvement of production. At the same time, comprehensive intensification is based on an enlarged role of science in development of production, on its transformation into a productive force of society in its own right. Science performs that role by coming closer to production, by strengthening the technical orientation in development of the fundamental sciences and through an organizational merger of sectoral science with the enterprises of industry and other branches of physical production.

The transformation of science into a productive force in its own right and the widespread application to production of the most recent technology and automated systems will gradually accomplish a substantial change in the character and content of the labor of workers and will make it possible to sharply reduce the expenditures of manual labor, above all heavy physical labor. The workers are being brought into the sphere of controlling complicated technical systems. As a result the differences between physical and mental labor are being erased more and more. As a consequence structural shifts will take place in the makeup of the aggregate worker: there will be a drop in the proportion of those employed in the sphere of physical production and an increase in the nonproduction sphere. Thanks to the rise in the level of general and vocational education, workers will be better qualified, and there will be an increase in the proportion of engineers and specialists with high qualifications. The law of the conversion of labor, substantiated by K. Marx, will be given greater play.<sup>3</sup>

The rise in the productive force of labor and enhancement of the role of the subjective factor in the intensification and efficiency of production are organically bound up with qualitative improvement of the means of labor and with the rising productivity of machines, equipment, instruments, and the equipment for automation of production and management. Noting the great importance of the means of labor, especially machines, to the development of production and to the change of the content of labor, K. Marx pointed out in "Das Kapital" that "economic ages do not differ in what is produced, but in how it is produced, in the nature of the means of labor. /The means of labor are not only a yardstick of development of human work power, but also an indicator of the social relations/ [in boldface] (emphasis mine--A.B.) in which labor is done."<sup>4</sup>

Under socialism the efficiency of new technology from the standpoint of the national economy, its social utility, is advanced into the foreground. At the same time it is very important to reduce the cost per unit of useful benefit of technology by increasing its productivity and improving other qualitative parameters.

The faster development of machinebuilding and its retooling outlined for the 12th Five-Year Plan and the subsequent period will be a most important factor in improving the quality of equipment and its productive force. This will make it possible, as emphasized in the 5th Session of the USSR Supreme Soviet, 11th Convocation, to increase the renewal of the active part of the productive capital of machinebuilding from 2.2 percent in 1985 to 9.7 percent in 1990. The branches within machinebuilding that will be developing at a faster rate will be machine tool building, computer production, instrumentmaking, and the electronics and electrical equipment industries, i.e., branches expected to considerably speed up technical progress within machinebuilding itself. The rates of their growth must be 1.3-1.6-fold higher than for machinebuilding as a whole. A rapid transition will take place to the production of new generations of machines and equipment capable of ensuring the application of progressive technologies, above all energy-conserving and resource-conserving technologies. It has been established that new pieces of technology put into production are at least 1.5-2-fold improved in their productivity and reliability over the analogous product being produced. At the same time the task

has been set of shortening the time required for research and development of new technology to between one-fourth and one-third of what it is at present.

More extensive use of the advances of the present-day scientific-technical revolution will bring about profound changes in the structure and quality not only of the implements of labor, but also of the subjects of labor. In the future branches producing economical and high-quality raw materials, supplies, fuel, and energy are to develop at faster rates. For instance, in the fuel and energy complex there will be substantial shifts toward increasing the proportion of gas and strip-mined coal. Provision has been made to improve the structure and quality of building materials. Their strength characteristics will be increased. The production of economical types of metal products and synthetic and other progressive materials will experience accelerated development. Thanks to performance of these measures resource conservation will become a most important factor in speeding up economic growth.

The restructuring of investment policy will have a great impact on the qualitative change of the productive forces. The principal emphasis is now being put on retooling production on the basis of the most recent technology. The plan calls for an extensive program of retooling and reconstruction of existing enterprises. Appropriations for these purposes will increase by 70 percent, and their share in the total volume of capital investments in production facilities will exceed 50 percent by the end of the 5-year planning period. As for new construction, priority must be given to building projects which speed up scientific-technical progress and the solving of social problems. Great importance is being attributed in this connection to the concentration of capital investments in the decisive areas which are crucial, as pointed out in the CPSU Program, to rapid attainment of a high benefit to the national economy and a balanced economic development, achievement of the largest growth of output and national income for each ruble that is spent.

One of the indicators of the comprehensive intensification of production is the improved utilization of productive capital. An immense potential for speeding up economic growth exists here. The total value of productive capital exceeded 1.5 trillion rubles by the end of the 11th Five-Year Plan. Its size has tripled over just the last 15 years. This means that the share of comparatively new assets has increased in the proportional breakdown of fixed capital functioning in production, and provided their utilization is improved (and one of the ways is to increase the shift coefficient) the real prerequisites exist for stabilizing the output-capital ratio by the end of the 12th Five-Year Plan and achieving a noticeable improvement of this indicator over the remainder of the forecasting period.

The comprehensive development and qualitative change of society's productive forces has decisive importance to speeding up economic and social development and to improvement of social relations. Taking advantage of the law of correspondence of production relations to the level and character of development of the productive forces, there is a need for a consistent and persistent effort to improve production relations and to orient them above all toward the economic mechanism, toward qualitative transformations in the economy, and towards an acceleration of its growth rates.

## II

In the light of the tasks set by the 27th congress of speeding up the country's socioeconomic development the economic sciences have a greater role and importance in working on the urgent problems in the theory and practice of improving the conduct of socialist economic activity and also in raising the level of qualifications of all personnel in the economy. At the same time greater attention must be paid to the intensification and efficiency of social production, to utilization of the productive potential, and to a resolute transition to fundamentally new technology and progressive manufacturing processes. The greater the productive power of a machine or other type of technology, the higher the level of labor productivity and the larger the saving that can be obtained in expenditures per unit of the final result. But it does not follow that the main essence of the productive forces comes down to technology. In "Zamechaniya na knigu N.I. Bukharina 'Ekonomika perekhodnogo perioda'" [Remarks on N.I. Bukharin's Book "The Economics of the Transitional Period"] V.I. Lenin criticized reduction of the essence of the productive forces exclusively to the technical aspect. Pointing to man's presence among the productive forces, he remarked that the "personal" (an imprecise term) is not "technical."<sup>5</sup> Both economic and social relations are manifested in the interaction between man and technology. The level of development of the productive forces stands as a condition for economic development. It also determines the vigorous impact of the productive forces toward altered production relations. K. Marx paid much attention in "Das Kapital" to analyzing the interaction between the technical and economic development of the productive forces. He examined their historical and logical relationship, beginning with simple cooperation and work done by hand and ending with complex machine production in the context of large-scale industry. This afforded him the possibility of framing a conclusion concerning the revolutionary character of the technical basis of industrial production even at the beginning of the 2d half of the 19th century. He wrote that "by virtue of the introduction of machines, chemical processes, and other methods it (i.e., industry) is constantly accomplishing revolutions in the technical base of production and at the same time in the functions of the workers and the social combinations of the work process as well. That is how it revolutionizes the division of labor within society so constantly and is continuously making mass transfers of capital and workers from one branch of production to another."<sup>6</sup>

But the interaction of the productive forces and production relations as the two sides of social production is not always traced in the present-day economics literature.

Underestimation of the interaction between the productive forces and production relations is not helpful to the development of the economic sciences or to their influence on production. In describing the structure of the economic basis we should note that socialist production relations express the directly social nature of the economic base of socialism and to that extent its structure: the forms of social ownership, collective directly social labor, distribution of material benefits among the workers according to work, commodity-money relations organized according to plan, cost accounting (khozraschet), and so on. Here the production relations serve as a form of development of

the productive forces, imparting social direction to their development. In this sense the patterns of improvement of production relations have an impact on development of the productive forces. In the structure of the economic sciences this relationship is reflected in enlargement of the role of the specific fields of economics: the economics of industry (or of its branches), the economics of the agroindustrial complex, construction economics, transportation economics, and so on. However, it is thought by some that these sciences study only production relations.

The entire body of sciences dealing with the economics of the national economy is called upon to study development of the components of the country's unified national economic complex in accordance with the system of the economic laws of socialism, which objectively are bringing about a strengthening of the social division of labor and an unstinting growth of its productive force, improvement of structural and investment policy, progressive shifts in the development and location of the productive forces, an increase in the efficiency of the means of labor and greater conservation of the subjects of labor, and the comprehensive economic development of economic regions.

It is very important in the planned management of the economy to take advantage of the laws of the planned and proportional development of social production, of the rising productivity of labor, of the social saving of time, and of other laws that bring about dynamic development and the qualitative improvement of the productive forces.

While formally acknowledging that political economy does study production relations in their linkage to the productive forces, the authors of many writings on the problems of political economy do not give a straightforward description of this linkage. As a result such important problems as the economic aspects of the acceleration of technical progress, qualitative changes in the structure of the aggregate worker, achievement of effective employment, the rise of the productive force of labor, improvement of product quality, resource conservation, and other things which directly characterize development of the social productive forces are for all practical purposes omitted from its subject matter.

The patterns of development of the productive forces and of their social forms are the subject of study of the concrete economic sciences. They must also be taken into account by political economy.

Take, for example, the productive forces of agriculture, their economic productivity. In that sector, just as in other sectors of the economy, the relationship of man to labor, to the means of production, the reproduction and distribution of material goods, and so on constitute the essence of production relations, which come to the surface of social relations in the concrete forms of productive consumption of the means of production, of appropriation, of the organization of production, of the application of the collective contract and remuneration according to the final result, of the use of commodity-money relations, etc.



But there are also other economic problems related directly to the development and qualitative improvement of the productive forces: effective application of productive and resource-conserving technology, optimum use of fertilizer, optimization of the scale and pattern of crop area, the combination of agricultural production with industrial production, improvement of the quality of agricultural products, and so on. Within the agroindustrial complex a number of problems related to improvement of the production relations have to be solved in order to create an economy with a higher level of organization and efficiency. At the same time profound qualitative changes in the productive forces of the APK, including activation of the human factor, strengthening the role of science and technology in raising the productivity of land and socialized livestock raising, as well as improvement of the system of cultivation, will have immense importance to acceleration of the country's socioeconomic development.

### III

The 27th CPSU Congress has emphasized the need for science and production to come closer and closer together, for enhancement of the role of science in development of the productive forces and in creation of fundamentally new types of equipment and processes, and in speeding up the rise of the productivity of social labor. The influence of the economic sciences toward solving the problems of the national economy in developing and locating the productive forces has to be strengthened within the shortest possible time.

What are the reasons for the lag of the economic sciences behind the requirements of reality? After all, it has to be admitted that economic scientists were unable to prepare on time a theoretical conception of the entire system of management and economic activity. The discussions of the criteria and indicators of the efficiency of social production dragged on intolerably. And other problems of the economic sciences are also awaiting their solution.

The main reason for this situation lies in our view in the fact that sufficient work is not being done on the problems of improving the organization and increasing the efficiency of social production, including its concentration, specialization, and combination, the optimum combination of small, medium-sized, and large enterprises, and the priority lines of scientific-technical progress. Many economics institutes have done research that was divorced from production, without the requisite analysis of real facts and statistical groupings, resorting to purely logical and abstract arguments. That accounts for the large number of poorly argued viewpoints on problems which have urgent practical importance. A number of problems of political economy have been worked on without due consideration for the economic laws of socialism and the laws of natural science, and also without overcoming the contradictions that exist in the economy, including the contradiction between production relations and the productive forces.

The second reason is the insufficient attention paid to the urgent problems of the specific economic sciences, above all to the pattern of qualitative change of the productive forces of society. Few economists are being trained with a broad background for work in government agencies concerned with the economy

and for scientific research on the economics of the national economy. Specialists in the field of planning, labor economics, finance, credit, pricing, and other spheres of the economy in many cases have a poor mastery of the knowledge of present-day methods of economic analysis and scientific forecasting, and they make little use of the methods of mathematical economics in their work.

The lag of the economic sciences and accordingly of economic thought as well quite often holds back the application of inventions and innovations. It is well known that beginning in 1974 our country has been first in the world in the number of registered inventions. The economic benefit from their use has grown more than 20-fold over the last 20 years. But the use of inventions has still been poorly organized in many ministries; new technology based on the inventions is slow to be applied to production. At the conference in the headquarters of the CPSU Central Committee on the questions of acceleration of scientific-technical progress (1985) Minkhimprom, USSR Minchermet, USSR Minstroyaterialov, and USSR Minneftekhimprom were criticized for the lag in technical policy. These ministries have let up in the tension paid to inventions and patents and licensing, and this has inevitably resulted in a deterioration of economic indicators.

For many years the economic thinking and planning activity of personnel of these ministries have been directed predominantly toward increasing the quantity of output. The technology of production has been slow to improve, and there has not been a solid change of direction toward indicators of quality and efficiency. As a consequence the cost approach has predominated, and poor use has been made of the qualitative factors of economic growth. Specific evidence of this is contained in the following facts: the number of inventions sent to be patented abroad decreased between 1981 and 1984 7.5-fold for USSR Minstroyaterialov and fourfold for USSR Minchermet. In 1984 these ministries sold the same number of licenses as in 1975, while USSR Minneftekhimprom and Minkhimprom sold tenfold and fivefold fewer, respectively. Certain ministries which possess a large-scale sectoral science with respect to the size of its staff have not taken specific steps to increase the effectiveness of science. The fund for remuneration of the personnel of NII has been formed without taking into account the benefits which developments afford from the standpoint of the national economy.

Of course, the progress of the specific economic sciences is possible only on the basis of Marxist-Leninist political economy. It is called upon to reveal more profoundly the operation of economic laws and the patterns and categories of production relations, to scientifically substantiate ways of improving them in association with the problems which have become urgent in the qualitative transformation of the productive forces.

Theoretical substantiation of the prospects for further development of the two forms of socialist ownership and for their gradual transformation into a unified ownership by the entire people has the greatest scientific importance. The advantages of the state and kolkhoz-cooperative forms of ownership are still being insufficiently utilized to speed up scientific-technical progress and for intensification of production. The growth of the two forms of social

ownership into a unified ownership by the entire people will take place gradually, since they have by no means exhausted their potential and are in need of improvement on the basis of a strengthening of the role of work collectives in effective disposition of social property, in introduction of full cost accounting, and the greater effectiveness of economic incentives.

Economists owe a great deal to science and practice with respect to theoretical substantiation of the problems that have become urgent in improving the relations in distribution and exchange. It is also a question here of adhering to the principle of social justice. It can be realized strictly provided there is consistent application of such economic laws and principles as the distribution of material goods with respect to labor, equivalent exchange of the products of labor, the correspondence of prices to value, and of effective demand to the volume of goods to be sold to the public. Social injustice quite often occurs as a consequence of shortcomings in the system and forms of remuneration, because of unsubstantiated distribution of capital investments for construction of housing and cultural- and consumer-service facilities over the regions of the country, and also in a number of other cases related to violation of the principles of socialist economic activity.

Take for example the complicated problem of guaranteeing correspondence between the constantly growing demand of the public to the growth of commodity resources and services. The first thing that needs to be done to solve it is to determine the most effective directions for the retooling of sectors producing goods and services, to improve the organization of state and cooperative trade, to make it more effective, to eliminate unsubstantiated differences in the level of retail prices, to strengthen direct relations between industry and organizations in the trade sector, and to set up industrial trade associations (combines), and so on.

Forward progress in this matter is being held up by the scant theoretical substantiation of the problems of using commodity-money relations. A situation has come about where scientific research has been conducted mainly on two aspects of commodity-money relations: the reasons for their existence under socialism and the specific features of their use. This growth with low productivity has tended to weaken research on a whole series of economic categories related to commodity-money relations: for example, prices, finance, credit, the circulation of money, distribution of gross income and profit, which could not but affect the substantiation of the indicators of the economic efficiency of production, new technology, and capital investments.

But it is not just that political economy is lagging somewhat behind. The sectoral branches of economics, including labor economics, the economics of agriculture and the APK, the economics of capital construction, are failing to keep up with the demands of life to an equal, if not greater, degree.

USSR Minvuz and the relevant departments should rework syllabi in the economic disciplines. There is a need for improved classification of the economic sciences. Particular attention should be paid to the publication of good and durable textbooks on the economic sciences. It would be advisable for the competent authorities to centrally assign teams of authors to prepare textbooks

on the principal economic disciplines. A determined effort is needed to improve quality, rather than increasing the number of textbooks bearing the same name. In our view there is a need for the relevant ministries and departments to adopt a decision to improve the economic training of brigade leaders, engineers, shop chiefs, and other subdivisions of associations and enterprises.

Mastery of a knowledge of economics by the broad masses of workers is a most important prerequisite for organizing truly nationwide recordkeeping and monitoring in the economy and for enhancing the role of work collective in management of production. This is especially necessary in the context of the sharp change of direction of the Soviet economy toward the strategy of intensive development and acceleration of the growth rates of the productivity of social labor. At every enterprise concern has to be shown for economical use of raw materials, supplies, and fuel, for achievement of improved product quality, and for attainment of the best final results at the lowest cost.

In combination with improvement of centralized planned guidance of the economy there needs to be a broadening of the economic initiative and enterprise of work collectives in improving the quality of their performance, in making maximum use of untapped internal potential, in increasing the effectiveness of work, and in utilization of productive capital and capital investments. All of this necessitates closer attention to the economic methods of management and economic activity.

#### FOOTNOTES

1. "Materialy XXVII syezda Kommunisticheskoy partii Sovetskogo Soyuza" [Materials of the 27th CPSU Congress], Moscow, Politizdat, 1986, pp 38-39.
2. Ibid., p 33.
3. K. Marx and F. Engels, "Soch." [Collected Works], Vol 23, p 498.
4. Ibid., p 191.
5. LENINSKIY SBORNIK, No 11, p 371.
6. K. Marx and F. Engels, op. cit., p 489.

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## PLANNING, PLAN IMPLEMENTATION

### GROWING IMPORTANCE OF FIVE-YEAR PLANS ENVISAGED

Moscow PLANOVYE KHOZYAYSTVO in Russian No 9, Sep 86 pp 3-12

[Article by V. Kirichenko, doctor of economic sciences: "Enhancing the Role of the Five-Year Plan"]

[Text] I

Socialism differs fundamentally from all social formations preceding it in that together with eliminating private ownership of the means of production society establishes control over the productive forces, over production, over the exchange in distribution of products, and economic development is brought into conformity with a plan--is consciously managed. The management of the economy under socialism, as foreseen by the classics of Marxism-Leninism, is accomplished "in accordance with a plan that has arisen out of the available resources and the needs of society as a whole."<sup>1</sup>

Socialist planning makes it possible to formulate the social goals of economic and social development clearly and in definite quantitative terms, to concentrate resources, and to commit them to solving the key problems. National economic plans are an expression of the economic policy of the Communist Party and the Soviet state and a powerful instrument for performing the fundamental tasks of the economic and social development of a socialist society. And 5-year plans occupy the principal place in the system of those plans.

The plan has an immense role to play in mobilizing the creative forces and initiative of the masses. "It is on the basis of plans," it was said in the session of the USSR Supreme Soviet which adopted the 12th Five-Year Plan, "that in our socialist society the energy of millions flows into a single stream directed toward accomplishment of the most immediate and long-range tasks. The plans provide a clear and stable perspective for the development of each work collective, every branch and sector, and every republic."<sup>2</sup>

The experience of 5-year planning has made it quite obvious that conscious management of the economy on the scale of the entire country is a fundamentally new phenomenon in the entire history of humanity and one of the most outstanding achievements of science and practice in the revolutionary transformation of the foundations of social life.

The tasks of each 5-year plan--and the 12th provides new confirmation of this--have expressed and do express the fundamental interests of society, of the working masses. Their fulfillment has naturally become the vital cause of all the members of our society, and it is therefore natural and normal for socialist competition--so broad as to encompass tens of millions of people, comprising a workers' movement--to develop in the effort to fulfill the assignments of 5-year plans. It has become an expression of one of the basic historic features of socialism--the growth of the vigor and creativity of the masses in constructive activity. The June (1986) Plenum of the CPSU Central Committee appealed to the workers of the Soviet Union to organize on a broad scale nationwide socialist competition for successful fulfillment of the assignments of the 12th Five-Year Plan and to turn bold plans and conceptions into the energy of practical actions aimed at raising labor productivity, improving product quality, and conserving resources.

Important steps have been taken in recent years to raise the scientific level and quality of 5-year plans. Planning horizons have been broadened, the long-term orientation in the system of plans and the forecasting and analytical grounding of planning decisions have been strengthened. The Comprehensive Program for Scientific-Technical Progress is now being drafted for the next 20 years by 5-year periods, including more detailed descriptions of the first of those periods. Target programs to solve scientific-technical, economic, and social problems and also target programs for development of regions and territorial-production complexes have become an important component of planning. National economic plans reflect more fully and consistently the problems of social development and represent the comprehensive approach to planning segments of interrelated branches (the APK and the fuel-and-energy, machinebuilding, and construction complexes). The range of balance-sheet computations has broadened, various models of the intersector balance and methods of optimizing planning decisions are being used, and computers have come to be used more widely and systematically.

But the practical role of 5-year plans has proven to be clearly less than it should be and has not been meeting the fundamental requirement that they become the principal form of planning and basis for the organization of economic activity at all levels of the economy.

Five-year plans have not always become a truly vigorous instrument for exerting pressure toward qualitative changes in the economy, above all with an impact on its efficiency. At times certain adverse trends are hardened and unwise economic decisions reinforced through plans (the predominant orientation toward extensive methods of achieving economic growth; overextension of the scale of ongoing capital construction and a distribution of capital investments which resulted in a slowing down of renewal of operating productive capital; insufficient efforts toward further development of machinebuilding--which is the physical foundation of technical progress in the economy--and toward its conversion to the resource-conserving type of development, and certain others as well).

Five-year plans have been incorporating sizable elements of internal inconsistency, which has in actuality taken away their stability and necessitated

periodic corrections. Inadvisable methods of achieving internal consistency have been set down in plans, methods which might have yielded a temporary effect, but did not afford a fundamental solution to the problem as a whole (systematic expansion of the size of the labor force instead of decisive technical measures to reduce manual labor and economic steps to stimulate reduction of employment in existing production; the scattering of capital investments instead of their concentration, which has resulted in a prolongation of construction times; the boosting of sales in order to meet effective demand for expensive goods or such socially undesirable products as alcoholic beverages).

Often the system of reference points and indicators of 5-year planning periods has been disrupted by adoption, even while the plan is being carried out, of additional decrees and programs for solving particular problems that have become urgent. The execution of these additional decisions, which were not envisaged at the time when the 5-year plan was drafted, upsets its stability. This approach to the plan was discussed back in 1923 at the 12th Congress of the Russian Communist Party (Bolshevik), which pointed out that "there needs to be decisive opposition both at the center and locally to attempts which represent haste, urgency, and improvisation; such attempts should be viewed as manifestations of economic rashness...."<sup>3</sup>

For these and other reasons a large load was placed on annual planning. Whatever had not been sufficiently thoroughly and reliably worked out in the 5-year planning period had to be dealt with in annual plans. As pointed out in a session of the USSR Supreme Soviet in June 1986, there has in actuality been a moving away from the 5-year plan, and the national economy has essentially been developing in accordance with annual targets. The results of the 5-year plans for enterprises and sectors, for regions and republics, essentially come down to a summing up of annual plans. Thus under present conditions it is an urgent and important task to enhance the role of the 5-year plan and increase responsibility for its fulfillment.

## II

Analysis shows that in the process of forming the 12th Five-Year Plan an important step was taken toward performing the task of enhancing the role of the 5-year plan as the leading form of planning and as the basis for organizing economic activity. Its drafting was based on the Basic Directions of Economic and Social Development for the 15-Year Period, which had been approved by the party congress. The plan organically incorporated the following comprehensive target programs aimed at solving a number of major economic problems and covering both the period up to 1990 and also the period up to the end of the century: the Food Program, the Energy Program, the program for advancement of machinebuilding, the program for chemicalization of the national economy, and the program for development of the production of consumer goods and the service sector. This strengthened the scientific soundness of projections and laid the basis for safeguarding the logical continuity of the plans of successive periods with respect to their goals and means of attaining them and therefore the basis for planning to have a more vigorous impact on economic and social development.

The lessons of the past, when the raising of the rates was displaced to the final years of the 5-year planning period, so that the desired results were not forthcoming, were also taken into account. In the current 5-year planning period the total assignments are broken down by years in such a way that the greatest acceleration (for example, in the growth of the national income or industrial output) is foreseen in the first years, and a subsequent uniform increase in the rate of growth. This creates important prerequisites for reliability in carrying out conceptions and assignments of the 5-year planning period and lays more solid foundations than previously for the drawing up of annual plans.

Pursuant to the principles laid down by the 27th CPSU Congress, fundamentally new solutions for practically all lines of economic development have been incorporated in the 12th Five-Year Plan. The 5-year planning period which has just begun must become a 5-year period of qualitative changes. Its function is to accomplish those profound changes and indispensable changes of direction in economic development which make it possible to overcome the adverse trends that took shape in the seventies and early eighties and to initiate the shaping of new features of economic growth over the entire period up to the end of this century. The 12th Five-Year Plan has embodied the conception of acceleration of economic and social development advanced by the April (1985) Plenum of the CPSU Central Committee and comprehensively substantiated and elaborated in the materials of the 27th party congress.

Consistent raising of the rates of economic growth in each successive year of the 5-year planning period will make it possible to overcome the trend toward a slowing down of economic growth, which has been operative during the last three 5-year planning periods. At the same time the 5-year plan was so structured as to bring about the necessary preconditions for imparting a long-term character to the trend toward higher rates of economic growth. To that end, following the drop in growth rates of capital investments in the economy over the last 15 years, they are to be substantially speeded up (1.5-fold). The problems of proportions in distribution of productive capital investments by sectors and especially by types of projects for increasing production will be solved in a new way. These investments will be concentrated on the leading directions for technical-and-economic improvement of social production and for changes in its structure, with predominant attention paid to reconstruction and retooling of existing enterprises. Half of the capital investments are envisaged for those purposes in 1990 (which in absolute terms is 1.7-fold more than in the last 5-year period), and the scale of retirement and replacement of existing capital will be doubled. Important steps will thereby be taken during the years of the 12th Five-Year Plan toward performing a task of strategic importance--accomplishing a new technical reconstruction of the national economy. The shifts envisaged for the 5-year period in qualitative renewal of fixed productive capital are aimed at overcoming yet another adverse trend which took shape in the seventies--its increasing physical age and obsolescence, to speed up the physical application of advances of scientific-technical progress in the existing productive plant.

Thus with respect to growth rates the problem is being solved of a stable dynamic pattern in economic development sufficient and necessary for constant



maintenance of the material and technical base at the level of world advances of science, technology, and the organization of production and for systematic improvement of all aspects of the well-being of the population. But the main problem lies in qualitative transformation of economic growth, which is more complicated and significant than simply raising growth rates.

If the 12th Five-Year Plan is analyzed from this point of view as well, then we see that it calls for certain essential changes in quality and for turning around existing trends. The reference here is above all to the faster growth of the final product (machines, equipment, and the product of construction which go for simple and expanded reproduction of fixed capital, articles for nonproductive consumption) as compared to the intermediate product (fuel and energy, raw materials, and semifinished products). The dynamic pattern of production will be determined more and more by the output of machines and equipment with high technical-and-economic characteristics, by expansion of the assortment and improvement of the economic efficiency of building materials, by the faster-than-average growth of high-quality consumer goods which are in great demand, by the more optimum functional distribution of the increments of the social product, by a further reduction (to the allowed scale) of the value of unfinished construction, by an enlargement of stocks of finished goods and materials exclusively in keeping with the growth of production, and by a decisive reduction of unproductive product losses.

The volume of sales and paid services will grow more rapidly than the principal forms of personal money income, which will improve the balance between effective demand and the supply of goods and services. New construction sites and reconstruction projects will be included in the plan only if the capital investments and capacity of construction and installation organizations have been set aside for them so that the standard allowed project construction time will be adhered to. This is essential to balancing the scale of construction taking place at any one time with the resources and capacity for capital construction. These two aspects of balanced economic growth must, of course, be monitored and thoroughly worked out during preparation of each new annual plan.

With respect to capital investments, particular attention should be paid to those sectors to which resources are being committed at a substantially higher rate: for example, machinebuilding. In the branches of that complex, as shown by an analysis of capital construction plans, the scale of unfinished construction exceeded the standard between 1.5- and 4-fold at the beginning of 1986. This means that when the volume of capital investments allocated for this year is taken into account, it will take between 2.5 and 10 years just to finish the construction projects already under way. Achievement of a high degree of concentration of capital investments on construction projects and a shortening of construction time are an invariable condition for effective fulfillment of the large construction program which has been outlined by the 12th Five-Year Plan.

Solving the problems of acceleration of scientific-technical progress and achieving a new quality of economic growth presuppose profound structural changes in the makeup of production. They are taking place along two main

lines: priority development (higher rates of growth and a corresponding increase of their share of output) of those sectors which determine to the greatest degree the acceleration of scientific-technical progress (for the twelfth 5-year planning period this is above all machinebuilding) and within all sectors predominant production of those products which afford a benefit in resource conservation and improvement of product quality.

One of the most important characteristics of the new qualitative element in economic growth is its more intensive social orientation. In past periods of the development of our national economy high growth rates have been maintained above all by accelerated output of means of production accompanied by a limitation of resources allocated for development of production of consumer goods.

The tasks of speeding up economic growth can be performed only if there is a substantial expansion of production and improvement of quality of products and services to satisfy the multifarious needs of the workers, if the material base of a vigorous social policy is strengthened in this way, if the effect of economic incentives is strengthened, and if all aspects of the life of the Soviet man are improved. Otherwise the acceleration and qualitative transformations of production will not be achieved.

"The high targets outlined in the plan," it was noted at the June (1986) Plenum of the CPSU Central Committee, "necessitated a new approach to determining the sources of economic growth. Radical improvement of the indicators of production efficiency by accelerating scientific-technical progress is decisive here. This, comrades, is the foundation on which the entire plan is built."<sup>4</sup> The system of its assignments and indicators is oriented toward evolution of the intensive, resource-conserving pattern of development, toward formation of a "cost-fighting" mechanism of reproduction. Beginning with the 12th Five-Year Plan the growth of physical production as a whole is to be achieved practically without increasing the size of the labor force, by raising labor productivity. The bulk of the economy's additional need for fuel, raw materials, and supplies will be met through their conservation.

All of these new approaches to the fundamental questions of economic growth must be consistently concretized and laid down in annual plans and further developed and elaborated in the subsequent 5-year plans up to the year 2000. The stock of ideas embodied in the 12th Five-Year Plan determines the content of all forms of planning work both for the period immediately ahead and also for more remote periods. At the same time the experience in drafting it has exposed the need for further improvement of the process of substantiating 5-year plans. The socioeconomic conception of the future plan, its outlook, should be represented more straightforwardly and elaborately so that it gives a purposive orientation on the basis of a single platform for all subsequent stages and all participants in drafting the plan at all levels. This is an important condition for consistent achievement of the primacy of the national economic approach to shaping the plan, which has always been necessary and doubly necessary when it is a question of the practical accomplishment of major changes in economic policy in accordance with the present-day programmatic principles of the CPSU.

This makes it a necessity to enhance the role of summary planning. To be sure, its functions must at the same time be stated more precisely. For a long time they were almost literally planning projects which summarized, generalized, and added up figures by sectors and functions. To a considerable extent it is still that in USSR Gosplan and at the level of the multisector complexes which have been distinguished and their corresponding administrations. The real essence of summary planning is to shape the initial conception of planning computations and the system of qualitative requirements for them (especially with respect to efficiency) in accordance with the fundamental lines of the economic policy being conducted in the given stage or outlined for the future, and guaranteeing that those requirements are met by planning computation in all entities where the national economic plan is being substantiated. If the next 5-year plan is to be substantiated more reliably, the basic directions of long-range economic and social development (over 15 years) must contain a more detailed set of economic characteristics, indicators, and their planning substantiations than is now the case.

The problems of strengthening the balance of economic growth, of improving the work with balances both in the stage of shaping the conception of the plan and also in the period of working out its alternative versions, of shaping the version of the plan that is adopted, and of summarizing the planning computations and substantiations are becoming urgent. Here we are talking about the active use of the balance of the economy and various modifications of the intersector balance of product production and distribution. Under present conditions development of balance-sheet computations of the 5-year plan in USSR Gosplan necessitates the introduction of the experimentally tested central set of tasks of the ASPR. It seems advisable to unify both in organization and in essence the effort going on at administrations for planning multisector complexes to prepare physical balances and plans of product distribution, including the functions of planning the production of the respective products. The problem of strengthening the work with balances in ministries deserves particular attention (consideration and a solution). At the present time they bear only formal accountability for meeting the needs of society for particular products, but their real concern is mainly centered on problems of producing them. If they are to fully perform the task that has been placed on them, the ministries must take over a function that has dropped out of the sphere of their activity--product distribution. To this end the ministries, which are the command headquarters of sectors, must study society's needs for the products produced by their subordinate enterprises, do the work with balances and on that basis prepare not only production plans, but also drafts of product distribution plans. The organizational prerequisite for this solution of the problem (consequently, for enlarging the role of ministries in the work with balances) is to transfer to them the soyuzglavsbyty and in a number of cases even foreign trade associations.

Organizational schemes and methods for drafting comprehensive target programs should also be introduced in which they are bound up inseparably with the shaping of the plan as a whole (that is, to eliminate inconsistency in the drafting of the programs and plans). The transition from two-level drafting of the sector breakdown of the plan after the pattern "national economy--sector" to a three-level scheme--"national economy--intersector (multisector)

complex--sector"--should be further deepened and elaborated on behalf of more thorough treatment of the intersector aspects of economic development. This transition has already been reflected in the drafting of multiannual plans and programs for development of the agroindustrial complex, the fuel and energy complex, and the transportation complex. A three-level scheme for sectoral planning is being followed in developing the ASPR of USSR Gosplan. Later the configuration of intersector complexes will have to be defined more precisely, methods adopted for planning their development, and planning by complexes transformed into the predominant form of planning physical production within the framework of "USSR Gosplan," and procedures worked out for mutual reconciliation of the planning indicators of development of the national economy as a whole, of complexes, and of individual sectors.

Sector planning in central planning bodies should be concentrated on shaping the strategy for development of sectors, on achieving retooling of production, on raising the technical level and quality of the product, and on efficient utilization of centrally allocated resources. Here it would be advisable to intensify differentiation of the set of planning indicators of sectoral development so as to take into account the specific features of groups of sectors and the economic purpose of the product they produce (distinguishing such sectors, for example, as extractive sectors, small-series machinebuilding and machinebuilding engaged in large-scale production, construction, production of consumer goods and services, transportation). The question of a differentiated approach as a whole to the shaping of planning schemes, the structuring of the system of the indicators of the plan, to selection of the particular balance among binding measures specifically addressed and economic measures which exert pressure indirectly on the particular units of the economy deserves particular attention, thorough treatment, verification, and realization.

### III

In evaluating the first lessons and conclusions from the reorganization that has begun since the April (1985) Plenum and elaborated following the 27th party congress, M.S. Gorbachev especially emphasized the following conclusion: "The reorganization presupposes comprehensive development of initiative and independence of work collectives and of all personnel. Under present conditions it is not permissible to deal with every question from the center, and this is in fact impossible as a practical matter. This truth has to be accepted by everyone."<sup>5</sup> Specific practical economic tasks are performed by work collectives, and the most important function of central management authorities is to create the necessary economic, legal, and social conditions for the effective performance of all economic entities in the interests of society.

The reorganization of the activity of management authorities must begin with the following fundamental requirements: a broadening of the independence and strengthening of the economic accountability of associations (enterprises) and local management authorities for the results of economic activity, restriction of the spread of command methods, and enhancement of the role of economic methods of exerting pressure based on appreciation of the material motivation of participants in economic processes. Economic levers and incentives must in the present stage exert a decisive influence on the course of further changes

for the better in the national economy. All of this necessitates quite significant changes in national economic planning and in the content and organization of the activity of central planning authorities.

A number of transformations have already been accomplished in drafting the 12th Five-Year Plan on the basis of the results of the large-scale economic experiment conducted since 1984 in broadening the rights and increasing the economic accountability of associations (enterprises). During the experiment success was achieved in lengthening the period of preplan work in order to involve associations (enterprises) more actively in drafting plans for development of production, to expand the sphere of application and strengthen the effectiveness of economic standards and the independence of enterprises in using resources obtained on the basis of cost accounting (khozraschet) (the funds for production development, social welfare and cultural programs and housing construction) for technical and social development, and to firm up the dependence of formation of the fund for remuneration upon the results of production activity. Enterprises have been given greater rights in using the saving on the wage fund, in setting prices on the basis of broader application of the system of price supplements (reductions). There has been a certain reduction in the number of command indicators assigned; to be specific, they no longer include the target given to ministries and enterprises for the volume of commodity output of industry.

It is characteristic of the 12th Five-Year Plan as a whole that measures to strengthen the effect of economic levers and incentives and for broad introduction of new methods of management and economic activity which have been experimentally tested and have proven their purposiveness have been organically included and elaborated in the plan as never before. Stable economic standards and allowances have been set down for the first time; this is an important precondition for organizing planning and all cost-accounting activity in the basic production unit. And as the new methods of economic activity are disseminated in the current 5-year period, they will undergo development through greater elaboration of cost accounting, the conversion of enterprises to self-financing not only with respect to current economic activity, but also in the sphere of expanded reproduction of fixed capital.

Improvement of the economic mechanism is one of those principal reserves which should be completely assimilated in the years of the 12th Five-Year Plan and used for its successful fulfillment. This is one of the elements of the conception of the 12th Five-Year Plan and an important means for strengthening its impact on the course of economic processes. At the same time the content and even more the results of those essential measures to alter the economic mechanism and conditions of planning which have been undertaken in the agroindustrial complex, light industry, trade, and a number of other sectors even since the 27th CPSU Congress could not fail to be taken into account in shaping the plan for the twelfth 5-year planning period. There remains a great deal of complicated work to do to further improve planning, including 5-year planning, in accordance with the principles set forth by the party congress and the experience that has been gained. This is a ramified problem, and only certain considerations as to the directions for solving it will be presented here.

Specific measures need to be defined for changing national economic planning of product production and distribution. The need for these changes is dictated by the new approaches and by the consistent realization of the principles adopted for concentration of the central level of management on multianual national economic problems, on determination of macroeconomic, intersector, and interregional proportions, on creation of conditions for developing economic initiative and increasing accountability of the basic production unit of sectors and republics for meeting the needs of society.

The indicator for the volume of intersector deliveries (for a consolidated product list and in value terms), which would be adopted at the level of the national economy and assigned to ministries, could take on particular importance in connection with these changes. As for volume indicators for production in value terms, it would be more advisable to make them calculated indicators (to be used in computing balances and analytical computations). The volume of activity of sectors and of the basic production unit would be determined according to the net output produced. The detailed production program and product mix in the production plan should be shaped both for the primary unit and for the sector as a whole in view of the needs of consumers. The meeting of this requirement will be guaranteed by comprehensive development of horizontal relationships on the basis of contractual relations. Aside from the consolidated assignments from above, the compiling and fulfillment of the plan stated for specific products would be regulated and stimulated by a system of economic standards and assignments for increasing the efficiency of resource utilization. In the context of extensive development of horizontal connections and contractual relations stating the needs of the consumer, additional incentives and penalties, this situation creates favorable conditions for independence, for workers in the basic unit, and local management bodies to display initiative, and for orientation toward the real needs of society.

In connection with performance of the task of strengthening the role of associations and enterprises in planning production activity, it seems indispensable to revise the scheme of planning so that it envisages for enterprises and associations the opportunities with respect to time and information to work out economic contracts in detail as the basis for shaping the production program.

Under present conditions enhancement of the role of the 5-year plan is determined to a considerable degree by the reliability and authenticity of the substantiations of economic standards which link the income of work collectives to the results of their economic activity (the standards applied to the distribution of profit and formation of the wage fund, the production development fund, the material incentive fund, and so on). By means of this lever it is possible, without intervening directly in current business affairs of associations and enterprises, to exert the necessary pressure on them, motivating them to make fuller use of their capabilities, to devise strenuous plans, and to give priority to nationwide interests in compiling their plans. It should be noted that in practice we have not yet freed ourselves of the tendency toward the methods of direct distribution as the only one that is natural and conforms to the functions of central planning. Here we need a certain psychological reorientation, since, as noted at the 27th CPSU Congress, "economic

standards are the instrument of the future in planned guidance. They thoroughly combine the principle of centralism in management of the economy with the use of commodity-money relations and the law of value."<sup>6</sup>

Mastering this instrument in national economic planning signifies raising financial planning to a new level, attributing greater importance to it throughout the entire system of balancing the physical and value aspects of the national economy's development. This specifically requires that two problems of some complexity be solved: how to include in the 5-year plan data on price dynamics and changes of price relations over the period covered by the plan, i.e., how to unify planning of physical proportions with the planning of prices, and how to work out the value indicators of the plan in current (planned) prices, and not only permanent prices. It is on the basis of current prices worked out for the principal products in the 5-year plan or in accordance with the rules of setting them on other products envisaged for that period that it is possible to devise realistic economic standards, to link the system of incentives to the plan, and to balance physical and financial flows in the national economy. In this case the economic standards will reflect the real economic relations and proportions embodied in the 5-year plan.

The problem is to shape the economic standards and levers of the 5-year plan into a logically ordered system that guarantees the transition from individually established standards to average standards, so that they encompass the distribution of the entire gross income of the association (enterprise) and make it possible to strictly differentiate cost-accounting funds of the latter as a function of the relationship between their individual production costs and those which are socially necessary. It seems that the charge on assets must become binding for all enterprises. In our opinion its necessity is not eliminated even when the self-financing of enterprises with respect to the reproduction of capital is introduced. Even in this case it remains a minimum social measure of efficiency in utilization of the resources which society as a whole is allocating for formation of the productive capital of enterprises.

All of this creates the conditions for solving the major problem of increasing the role of centralized planning along the main lines of economic policy while at the same time eliminating petty interference with lower-level authorities by renouncing the detailed predetermination of their pattern of action and by reducing the excessive number of indicators and targets. The principal functions of national economic planning have been and remain the scientific substantiation of the goals and tasks of economic and social development, establishment of economywide, intersector, and interregional proportions of social production so as to guarantee the fullest performance of the social and economic tasks which have been set, definition of priorities in structural, technical, and social policy and in the economic development of new regions; and formation of a logically ordered system of economic standards which orient the entire economic system toward efficient utilization of resources.

#### FOOTNOTES

1. K. Marx and F. Engles, "Soch." [Collected works], Vol 4, p 334.
2. PRAVDA, 19 June 1986.
3. "Resheniya partii i pravitelstva po khozyaystvennym voprosam" [Decisions of the Party and Government on Economic Matters], Moscow, Politizdat, 1967, Vol I, p 350.
4. "Materialy Plenuma Tsentralnogo Komiteta KPSS, 16 iyunya 1986 g." [Materials of the Plenum of the CPSU Central Committee, 16 June 1986], Moscow, Politizdat, 1986, p 12.
5. Ibid., pp 10-11.
6. "Materialy XXVII syezda Kommunisticheskoy partii Sovetskogo Soyuz" [Materials of the 27th CPSU Congress], Moscow, Politizdat, 1986, p 251.

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## INVESTMENT, PRICES, BUDGET, FINANCE

### MEASURES TO IMPROVE FIXED CAPITAL YIELDS PROPOSED

Moscow EKONOMICHESKIYE NAUKI in Russian No 9, Sep 86 pp 54-60

[Article by A. Katayev, Lvov: "Ways of Improving the Efficient Use of Fixed Productive Capital"]

[Text] Acceleration of the country's socioeconomic development presupposes the transition to the intensive mode of reproduction. One of the conditions for that transition is to use fixed productive capital more efficiently. The Basic Directions for the Economic and Social Development of the USSR Over the Period 1986-1990 and up to the Year 2000 have set the task of "improving the utilization of fixed productive capital, full employment of capacities and equipment, and achievement of a higher output-capital ratio."<sup>1</sup>

The USSR now possesses a mighty productive capability. Over just the period 1970-1984 fixed productive capital grew 2.8-fold, and its value at the end of 1984 was 1.49 trillion rubles. Yet the quantitative growth of fixed productive capital has not been accompanied by a corresponding rise in the efficiency of its use: Over that same period the national income increased 1.9-fold, and the productivity of social labor rose 1.7-fold.<sup>2</sup> This means that the rise of the principal indicators of the development of our national economy has been achieved mainly thanks to extensive factors. In judging the rapid growth and accumulation of fixed productive capital in the country to be a great achievement, it was noted at the June (1986) Plenum of the CPSU Central Committee, "we cannot fail to see that negative trends in its reproduction have been growing for a number of years.... The bulk of machines and equipment have been sent to new facilities, while at existing plants and factories the outdated equipment has actually not been replaced in good time. The process of capital renewal has been going too slowly, and its age structure has worsened."<sup>3</sup> The drop in the output-capital ratio in the economy has been an inevitable result of this.

The negative consequences of the drop in the output-capital ratio are obvious. Still, economists do not have an unambiguous answer to the question of the extent to which the declining trend in the output-capital ratio is objective and whether that trend can be turned. To be specific, it is thought by some that the drop in the output-capital ratio is part of the pattern of scientific-technical progress.<sup>4</sup> The opposite position is taken by economists who explain its drop in terms of the process of saturation of the economy with technology.

Completion of that process will bring about stabilization, and that in turn will be followed by a rise in the output-capital ratio.<sup>5</sup> This position leads logically to the conclusion that the dynamic behavior of the output-capital ratio is cyclical in nature.<sup>6</sup> In our opinion, the drop in the output-capital ratio is not a regular feature in the pattern of development of socialist production and is not cyclical in nature. We share the views of economists who feel that under present conditions the output-capital ratio can and must rise,<sup>7</sup> but if this is to happen, the influence of a number of negative factors on it must be eliminated.

One of the factors tending to lower the output-capital ratio is the relative increase in the expensiveness of new technology. For instance, the average annual rate of increase of the cost per unit capacity rose from 2 percent over the period 1966-1970 to 3 percent over the period 1971-1975 and to 5 percent over the period 1975-1980.<sup>8</sup> This increased cost is to be explained in large part by the fact that manufacturers of new equipment, in agreement with consumers, have been substantially increasing its rated efficiency, and the price is to a certain degree adjusted to that.

For example, on the 1400 mill manufactured by the PO "Uralsmash" for the Karaganda Metallurgical Combine the economic benefit agreed on by producers and consumers was 108.8 million rubles. But following an expert evaluation USSR Goskomtsen dropped it back to 34.6 million rubles, i.e., to less than one-third.<sup>9</sup> Yet in this neither the manufacturer nor the consumer was accountable for this kind of overstatement.

Quite often the drop in the output-capital ratio results from the introduction of automated equipment. In our view, the reason for this is that its potentially high capabilities (this especially applies to robotics) can be fully utilized only in an integrated application: when a system of machines, equipment, connections for the movement of materials, computers, and information capabilities is set up at the enterprise and when there is a corresponding change in the technical, economic, organizational, and social parameters of the production process. At present this technology is being applied piecemeal as a rule, in the form of individual units, and sometimes this is taking place at enterprises which do not have the conditions for its efficient use or do not even need it. A paradoxical situation is brought about: The enterprise acquires an expensive automatic machine capable of operating almost around the clock, yet since it has not been "matched" to the rest of the equipment, this automatic machine operates on one shift, and moreover it breaks down and stands idle more frequently than the other equipment because of the absence of highly qualified specialists in its adjustment and attendance. At the same time dozens of people at the enterprise may be employed at manual labor or jobs with a low level of mechanization and productivity although its full mechanization would have provided a far greater benefit than installing the automatic machines which are "not working."

We should also add to what we have said that the production of automated equipment, even if it is not becoming more expensive over time, is hardly ever becoming less expensive. To a considerable extent, in our view, the reason for this lies in the fragmented nature of its production. Equipment that is

similar in its technical characteristics (this especially applies to the production of robots) is manufactured by dozens of different enterprises belonging to more than 20 ministries, and at the same time they quite often do not have the necessary conditions and personnel for this purpose.<sup>10</sup> Moreover, it is even developed at these enterprises, beginning in the design stage. An unjustifiably large number of modifications exist as a consequence in equipment of the same kind.

According to the calculations of specialists, the possible combinations of task-specific automatic manipulators made up from standard elements to run metal-working and assembly equipment range over only 5 base models and 16 modifications.<sup>11</sup> The excessive number of modifications of robotized equipment makes it more difficult to operate and repair and certainly does not help to make it cheaper. It is not surprising, then, that the application of robots, machine tools with numeric programmed control, and automatic and semiautomatic machines is turning out not to be efficient enough.

For instance, in the industrial sector as a whole of Lvov Oblast over the 1976-1980 period automation accounted for only between 5.2 and 9.5 percent of the job slots eliminated, and in machinebuilding the figures range from 6.3 to 12.6 percent from year to year.<sup>12</sup> Moreover, the costs per job eliminated by automation was 27,000 rubles in the industrial sector of UkSSR, including 26,400 rubles in Lvov Oblast, and the average saving on wages was 4,000 rubles per worker per year. In other words, automation in its present form is quite often costing too much from the standpoint of the saving on live labor.

In our view the manufacturing of automatic equipment, robots, and computers should above all be concentrated in a small number of specialized enterprises and associations in order to make measures to introduce the automation of production more effective. This will make it possible to produce the optimum number of models of a given piece of equipment, to improve its technical characteristics, to improve its quality and reliability, to achieve a high degree of standardization, and to make the transition to the modular principle in its design.

There is also good reason to make the transition from applying single units in production to the application of automated systems and complexes. This means renouncing the practice of "scattering" automated equipment over dozens of enterprises, but rather concentrating it at a few enterprises where fully automated production operations can be set up. It is flexible automated production operations which in the present stage are the most efficient direction for automation, since they guarantee that production can be rapidly converted to manufacturing different products, and there is a substantial rise in labor productivity and reduction of capital intensiveness and materials intensiveness.

One of the reasons why the output-capital ratio has been dropping in recent years is that the activation of new productive capital exceeds retirement of old capital. One of the consequences is the disproportion between the growth of fixed productive capital and the available labor resources. "At the present time there are about 700,000 job vacancies in the industrial sector alone.

And this is when equipment is operating virtually on one shift. If the transition is made to a shift coefficient of 1.7, the number of job vacancies in the industrial sector would exceed 4 million. Tens of millions of rubles have been spent to create them."<sup>13</sup> The inefficiency of the use of equipment is specifically indicated by the fact that the shift coefficient has not exceeded 1.35 for a number of years in machinebuilding, where 25-30 percent of all the machines and equipment in the industrial sector are concentrated. At the same time, as a rule it has been lower for new equipment.

Support was given at the June (1986) Plenum of the CPSU Central Committee to the initiative of the Leningrad party organization in making the transition to utilization of the progressive new portion of productive capital on two and three shifts and of fulfilling the plan for the twelfth 5-year planning period on that basis, retiring outdated equipment from operation and using the area opened up to organize up-to-date production. In his address at the June Plenum of the CPSU Central Committee Comrade M.S. Gorbachev emphasized that the transition to operation on two shifts is an important initiative, especially for enterprises which are at the cutting edge of scientific-technical progress.<sup>14</sup>

Insufficient retirement of old equipment often has the result that there is not enough production area for the new equipment, and this means that the need arises to increase capital investments in new construction at the expense of reconstruction and retooling of existing enterprises. For instance, the share of capital investments in reconstruction and retooling was in 1980 31.6 percent of all capital investments for production projects. In 1984 it rose only slightly and stood at 35.2 percent.<sup>15</sup> And this at a time when investments in reconstruction and retooling are paid back on the average three times faster than those in new construction, and as a rule they do not increase the need for manpower. In the 12th Five-Year Plan the share of capital investments in reconstruction and retooling of existing enterprises in construction of production facilities is to be raised to 50 percent.<sup>16</sup> At the same time the transition from compiling the balance of labor resources to working out a unified balance of labor resources and jobs would in our view help to eliminate disproportions in the balance between fixed productive capital and labor resources.

The aging of fixed productive capital is yet another adverse result of its slow renewal. At the present time as much as 30-40 percent of existing equipment in the USSR's industrial sector has been in operation for more than 15-20 years.<sup>17</sup> The share of outdated products has been increasing correspondingly. For instance, in 1981 30.6 percent of the output of 11 machinebuilding ministries had been in production for more than 10 years.<sup>18</sup> The drop in the coefficient of renewal of fixed capital in the recent period and the consequent aging of the country's productive plant are making a substantial renewal of machines and equipment a priority task in the 12th Five-Year Plan: plans call for renewing the active part of all fixed productive capital by more than one-third and for bringing the renewal of equipment of the machinebuilding complex up to 10-12 percent a year.<sup>19</sup>

According to estimates of economists, the replacement period for models of means of labor that gives a rough idea of the lower limit of obsolescence in

production ranges from 5 to 10 years. Consequently, a substantial portion of the fixed productive capital now in use consists of obsolescent equipment. Operation of such equipment sometimes reduces labor productivity to a fraction, increases repair costs, and makes it necessary to increase the amount of capital and reserve capacities for performing the production program. All of this unquestionably lowers the output-capital ratio and slows down the growth of production and the rise of production efficiency.

The conclusion would seem to be obvious: the retirement of fixed capital has to be increased several times over and accompanied by a corresponding increase to 60-70 percent the share of capital investments committed to replacement of worn-out equipment. This will make it possible to step up the rate of renewal of fixed productive capital, and it will guarantee the retirement and replacement of its outdated portion in accordance with standard service life and eventually a reduction in the average standard service life (in 1975 it was set at a level of 20 years for metal-cutting equipment) to the lower limits of obsolescence (7-10 years). The 12th Five-Year Plan calls for increasing the rate of annual retirement of outdated equipment up to an average of 5-6 percent in order to speed up renewal of productive plant and to overcome the trend toward its physical aging and obsolescence, which recently has become more intense.<sup>20</sup> This kind of acceleration of the rate of turnover of fixed capital requires an increase in the production of means of production and a corresponding rise in the share of the accumulation fund in the national income. "In the light of the course adopted toward acceleration the CPSU Central Committee has deemed it advisable to undertake an increase in the growth rates of capital investments in production projects to 25 percent during the twelfth 5-year planning period, as against 16 percent in the last one. This, of course, entails a certain change in proportions in the distribution of the national income--an increase in the share of the accumulation fund in it.... Later plans call for stabilizing the share of accumulation or even reducing it somewhat."<sup>21</sup>

At the same time, in setting the task of accelerating the renewal of the existing productive plant, it has to be taken into account that the longer equipment operates, the less productive it becomes, and the larger the amount of fixed productive capital (including reserve equipment) that is needed to fulfill the production program, which also means a more substantial volume of repair costs. On the other hand, accelerated retirement of fixed productive capital and reduction of the amount of outdated equipment will make it possible to reduce the amount of capital necessary to fulfill planning targets (and this is especially important, above all from the standpoint of eliminating the disproportions that quite often occur between the number of workers and the number of job slots), and it will make it possible to increase the load on equipment and to raise the shift coefficient.

At the same time, when space is opened up in the workplace, it becomes possible to reduce the share of investments in new construction and to increase the share of resources committed to the active part of fixed productive capital, where on the average it is repaid in 2.5 years.

The drop in the growth of operating equipment will also make it possible to reduce expenditures for major overhauls. The scale of these outlays can be judged from the following data: every year 40 billion rubles are spent for repairs;<sup>22</sup> in the entire economy about 7 million persons are involved in repairing equipment and in the production of spare parts, and one out of every three machine tools is involved "in repairs";<sup>23</sup> in the industrial sector alone the repair of equipment costs 10 billion rubles a year, and more than 3 billion rubles of that amount go to repair equipment which has been operating beyond its normal operating life.<sup>24</sup> If we take into account that 73 percent of repair workers are engaged in manual labor with low productivity,<sup>25</sup> and the inputs of metal going into the production of replacement parts are comparable to metal inputs in the production of the equipment itself, then the inefficiency of spending money to keep outdated equipment in operating condition becomes still more obvious. What is more, repairs are not as a rule done by specialists; spare parts are manufactured by enterprises which are the consumers, their cost is high, and their quality is quite often low, and as a consequence major overhauls restore only approximately 35 percent of the equipment's original capability. Even specialized repairs do not make it possible to fully restore the equipment's original operating life.<sup>26</sup> The diversion of sizable resources for major overhauls which could have been spent to create highly productive new equipment is becoming one of the obstacles to scientific-technical progress.

In our view there is good reason to perform one and never more than two major overhauls of especially expensive and highly productive equipment and to give them up altogether for the general run of equipment. This unconditionally requires certain changes in the production and design of new equipment: even in the design stage provision has to be made for its optimum operating life (on the basis of the limits of obsolescence and trends in scientific-technical progress). Producers of new equipment accordingly face the task of not increasing the strength and durability which often are already excessive, but of increasing the uniform rate of wear and uniform strength of all the parts and assemblies, of increasing the fault-free operating life, of guaranteeing reliable operation of machines and equipment during their optimum operating life, after which they will be replaced by more up-to-date and more productive models. This approach to the production of new equipment would also make it possible to reduce its materials intensiveness and to lower the cost.

The share of depreciation deductions for replacement in the total amount of depreciation increases if major overhauls are given up or if their number is at least reduced for the general run of machines and equipment. We should note that the share of depreciation deductions for replacement has increased from 49.6 percent in 1970 to 60.3 percent in 1984 for the economy as a whole and from 51.4 to 60.6 percent in the industrial sector.<sup>27</sup> But in our view even this proportion of deductions going for replacement cannot guarantee intensification of production.<sup>28</sup> Increasing the amount of depreciation that goes for replacement will make it possible to make greater use of the depreciation fund for direct replacement of old means of labor by new ones, thereby guaranteeing a faster rate of renewal of fixed productive capital, higher efficiency of its use, and that also means greater production efficiency as a whole.

The importance of increasing depreciation deductions for replacement increases particularly if we take into account that in the context of present-day scientific-technical progress the prerequisites are being created for their transformation from the source only of simple reproduction of fixed productive capital to the source of expanded reproduction. But this is possible only if the outdated assets are replaced by the same number or fewer or of those which are new and technically improved, more productive, and less expensive per unit capacity.

At the present time, as we have already noted, the production of new equipment is accompanied by a relative increase in its cost. If that phenomenon is to be corrected, there will have to be significant changes throughout the entire cycle of reproduction of new equipment, including its design, creation, application, and operation. The length of only a part of that cycle, from beginning of design to application of equipment--is 7-10 years or more in some branches.<sup>29</sup> That is, even at the moment when the "new" equipment goes into production it is quite often ceasing to meet the needs of production, which have become stiffer over the time that has passed since the designing began. In our view, the task is not only to try to shorten the period for development and application of new equipment, but also to look ahead to the trends in the conditions of production when it is designed, to "assign" it technical characteristics that look ahead 10-15 years, also taking into account the planned optimum operating life of the means of labor. Greater authentic responsibility needs to be imposed on designers for proper substantiation of the rated capacity of machines and equipment.

At the same time the actual benefit from use of new equipment depends to a considerable degree on the conditions of its consumption and above all on how long it takes to reach rated output (for new enterprises it averages 3 years at the present time)<sup>30</sup> and how long it takes to bring equipment up to rated capacity.

In our opinion there is a need for changes in the method of planning the output-capital ratio as well. At the present time the level of the output-capital ratio is practically predetermined by the assigned volume of production of fixed productive capital. It would be wise if planning started with a certain level of the output-capital ratio that guarantees the most efficient use of the capital available at the enterprise, and then the enterprise would be assigned a planned volume of production based on that.

Changes ought to be made in the forms for computation of depreciation in order to stimulate more efficient operation of fixed productive capital. In the present period the "proportional method" of computing depreciation predominates--a constant rate of deductions is established over the entire service life of the fixed assets. Yet it would seem that a "regressive form" of computing depreciation better corresponds to the intensive mode of reproduction. It presupposes that a high rate of deductions would be in effect in the first years of the equipment's operation, but as it becomes older, the rate of the deduction drops; as a consequence most of the depreciation will be obtained in the first years of use of productive capital. The objections to introducing this form of computation of depreciation come down mainly to the idea that

this could make it take longer to obtain the full amount of depreciation, and as a consequence the consumer would be motivated to use the old equipment longer. To offset the possible adverse consequences of the regressive form of depreciation deductions a precise determination has to be made of the optimum operating life of each machine and each piece of equipment; this will make it possible to establish depreciation rates whose application will ensure full reimbursement of the value of equipment by the time its operating life expires. As for possible attempts by enterprises to lengthen the operating life of equipment in order to reduce the total amount of annual depreciation deductions (the older the equipment, the lower the rate of the deduction), in our view the higher costs of overhauls involved in operation of fixed productive capital beyond the optimum operating life exceeds the benefit obtained from the drop in depreciation rates. In future when conditions are created for renewal of equipment and machines at optimum intervals, regressive computation of depreciation might be supplemented with higher depreciation deductions for equipment that has been operated beyond its standard operating life in order to give enterprises greater motivation for this renewal.

#### FOOTNOTES

1. "Materialy XXVII syezda Kommunisticheskoy partii Sovetskogo Soyuza" [Materials of the 27th CPSU Congress], Moscow, 1986, p 274.
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3. "Materialy Plenuma Tsentralnogo Komiteta KPSS 16 iyunya 1986 goda" [Materials of the Plenum of the CPSU Central Committee Held 16 June 1986], Moscow, 1986, p 15.
4. See, for example, T.S. Khachaturov, "Effektivnost kapitalnykh vlozheniy" [The Efficiency of Capital Investments], Moscow, 1979.
5. A.I. Notkin, "Tempy i proporsii sotsialisticheskogo vosproizvodstva" [The Rates and Proportions of Socialist Reproduction], Moscow, 1961; A.I. Krakovskiy, "Effektivnost ispolzovaniya osnovnykh fondov v mashinostroyenii" [The Efficiency of Utilization of Fixed Capital in Machinebuilding], Moscow, 1972.
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12. M.I. Dolishniy, S.N. Zlupko, and V.I. Zhovtanetskiy, "Intensifikatsiya--strategiya razvitogo sotsializma" [Intensification--The Strategy of Advanced Socialism], Kiev, 1984, p 53.
13. "Materialy Plenuma....," p 16.
14. Ibid., p 20.
15. "Narodnoye khozyaystvo SSSR v 1984 g.," p 380.
16. "Materialy XXVII syezda....," p 278.
17. M. Zotov, "Intensification of the Investment Process," VOPROSY EKONOMIKI, No 2, 1984, p 19.
18. Ya. Ryabov, "Management of Scientific-Technical Progress and the Rise of Production Efficiency," PLANOVOYE KHOZYAYSTVO, No 10, 1982, pp 4-5.
19. "Materialy XXVII syezda....," pp 278, 285.
20. Ibid., p 241.
21. Ibid., p 232.
22. Ye.A. Ivanov, "How To Increase the Output-Capital Ratio," in the book: "Problemy ekonomiki razvitogo sotsializma. Voprosy teorii i praktiki" [Problems of the Economy of Advanced Socialism. Issues in Theory and Practice], Moscow, 1983, p 109.
23. V.I. Pavlyuchenko, "Ekonomika razvitogo sotsializma. Krupnomasshtabnost. Problemy razvitiya" [The Economy of Advanced Socialism. Its Large Scale. Development Problems], Moscow, 1983, p 60.
24. "Materialy Plenuma....," p 16.
25. L. Lakunina, "The Depreciation Fund in the Context of the Intensification of Social Production," EKONOMICHESKIYE NAUKI, No 7, 1984, p 45.
26. V.I. Pavlyuchenko, op. cit., p 60.
27. Computed from figures in "Narodnoye khozyaystvo SSSR v 1984 g.," p 572.

28. We will note for sake of comparison that the share of depreciation for replacement in the advanced capitalist countries averaged 70-75 percent over the period 1970-1980 (see G. Aleksandrov, "Intensification of the Renewal of Fixed Capital," EKONOMICHESKIYE NAUKI, No 7, 1984, p 41).
29. Ya.B. Kvasha, "Faktor vremeni v obshchestvennom proizvodstve" [The Time Factor in Social Production], Moscow, 1979, p 75.
30. Ye.A. Ivanov, op. cit., p 111.

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## AGRO-ECONOMICS, POLICY, ORGANIZATION

### ROLE OF PROPORTIONATE CAPITAL INVESTMENT NORMS IN APK BRANCHES

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 9, Sep 86 pp 111-114

[Article by A. Patskalev, sector head at the Scientific Research Institute of Planning and Norms under the USSR Gosplan, doctor of economic sciences: "Setting of Capital Investment Norms in the APK"; first paragraph is PLANOVOYE KHOZYAYSTVO introduction]

[Text] Norms are the basis for planning capital investments in the APK \* Norm differentiation improves the quality and balance of plans \* Improvement in methods of calculation is an important prerequisite for determining progressive norms.

In accordance with Basic Directions in the Economic and Social Development of the USSR for 1986-1990 and for the Period Until the Year 2000 one-third of all capital investments is allotted for the country's agro-industrial complex (APK) during the 12th Five-Year Plan, which is 22 percent more than during the previous five-year plan. At the same time, priority is given to sectors processing agricultural raw materials. Capital investments in the APK should ensure a systematic development of its material and technical base, as well as the retooling and reconstruction of existing production. The share of capital investments for these purposes increases from 37 percent in 1985 to 50 percent in 1990.

In resolving the assigned tasks, a big role is assigned to the utilization of the norm method at all management and planning levels. Its introduction presupposes the development of a set of norms and standards differentiated in terms of planning levels (administrative-territorial), temporary periods (annual, 5-year, and long-term), types of operations and products (grain, milk, and butter), and so forth.

Work on the formation of departmental and republic systems of norms and standards for planning the development of APK branches is carried out in them. Norms of specific capital investments--the basic tool for substantiating the limits of capital investments for the development and accelerated renovation of APK fixed capital on a modern technological basis during the 12th Five-Year Plan--occupy an important place in these systems. They have also found application during the coordination of title lists of construction projects, technical and economic substantiation of new construction projects included in

the plan, expansion and reconstruction of existing enterprises, comparison of variants of planned solutions, expert examination of plans, and analysis of the effectiveness of capital investments.

For 1986-1990 in accordance with the Unified List of Sectors, Subsectors, Types of Industries, Enterprises, Buildings, and Installations approved by the USSR Gosplan and the USSR Gosstroy sectorial scientific research institutes under the guidance of the Scientific Research Institute of Planning and Norms under the USSR Gosplan have worked out norms of specific capital investments for all directions in production construction in APK branches, as well as for housing and municipal construction in rural areas. They are subdivided into individual (for individual enterprises); consolidated (for types of industries, subsectors, and so forth); common (for subsectors); combined (for sectors). These norms have been set in prices put into effect as of 1 January 1984. They take into account all the expenditures envisaged by the consolidated estimate for the construction of enterprises and projects. They are determined for the USSR as a whole, the union republics, RSFSR economic regions (separately for Moscow Oblast), the Ukrainian SSR, and the natural zones of the Kazakh SSR. Sectorial and territorial coefficients of change in the estimated cost of construction and installation work for APK projects throughout the country's regions and coefficients of change in the cost of equipment are used for the determination of such norms in other regions (oblasts).

The following served as the calculation base for developing norms of specific capital investments: representative plans of agricultural projects, which in technological, volume-planning, and design solutions are the most economical and ensure a high-level development of subsectors; efficiently built representative projects; parameters of capacities scheduled for commissioning; technical and economic substantiations for the retooling, reconstruction, expansion, and new construction of APK enterprises. At the same time, materials of the overall program for scientific and technical progress, schemes for the development and distribution of sectors, and assignments of the Food Program were also utilized.

Individual, consolidated, and common norms of specific capital investments single out expenditures on construction and installation work and on equipment, as well as other expenses, and take into account real changes in the cost of construction determined by local conditions; combined norms, expenditures on replacement of retired fixed productive capital, increase in fixed capital through retooling, reconstruction, expansion, and new construction, and change in expenditures on an increase in construction under way, as well as the cost of equipment not forming part of the estimate of construction projects, and so forth.

Let us examine the characteristics of some norms. For example, in plant growing and processing sectors norms have been set for perennial plantations (orchards, small-fruit patches, vineyards, tea, hop gardens, and mulberry trees); for the construction of hothouse combines and storage facilities for vegetables, potatoes, and fruits; for kolkhoz and sovkhos enterprises engaged in grain and seed storage and in the initial processing of agricultural

products (production of canned fruits and vegetables, dried fruits and grapes, and quick-frozen products), as well as for food industry enterprises.

The peculiarity of perennial plantation norms lies in the fact that they have been worked out on the basis of long-term technological charts envisaging intensive plantation cultivation technology. They include the following: direct expenditures and overheads on the planting and care of young plantations until they enter commodity fruit bearing minus the cost of the harvest obtained during the period of care, as well as the cost of production construction technologically connected with the establishment of perennial plantations (brigade camps, chemicalization centers, plantation roads, and fences).

During an expert examination the following expenditures were excluded from the value of norms: on soil preparation (cultivation of low-fertility soil); extraction, transportation, and utilization of peat and sapropel; liming of acid soil, including the cost of lime materials and their transportation and application to soil, as well as expenditures on the preparation of planning estimates for the indicated work. According to the statute in effect, these expenditures are financed from state budget funds and, therefore, should be determined according to independent norms. Furthermore, expenditures on the construction of reclamation systems and intrafarm roads, as well as those determined according to independent norms, are excluded. As a result, the following normative need for capital investments, on the average, in the USSR (per hectare) for the development of the following has been set: an industrial orchard, 5,655 rubles, including establishment and care, 3,867 rubles; a vineyard, 7,600 rubles, including the cost of establishment and care, 5,100 rubles; a hop garden on impregnated wooden props, 10,142 rubles, and on reinforced concrete props, 12,332 rubles.

Norms of specific capital investments for enterprises engaged in the postharvest processing and storage of grain and seeds have been set for the following: new construction for food and fodder grain and pulse and hulled crops with and without drying; food and fodder corn grain; seeds of grain, pulse, and hulled crops with and without drying, as well as corn, sorghum, sunflower, rice, and grass seeds; for reconstruction for food and fodder grain, pulse, and hulled crops with and without drying; seeds of grain, pulse, and hulled crops with and without drying; grass seeds. Individual norms for these enterprises for the 12th Five-Year Plan have been lowered by 1 to 6 percent as compared with the 11th Five-Year Plan. Therefore, common norms, on the average, in the USSR have been reduced, totaling 166 rubles 26 kopecks per ton during a season, including 125 rubles 26 kopecks for reconstruction.

Norms of specific capital investments for hothouse combines (individual and consolidated) have changed owing to measures to increase the yield, to protect the environment, to save fuel-power resources, and so forth. This has affected the value of common norms, which, on the average, in the USSR total 82 rubles 78 kopecks per square meter of inventory area and with due regard for the reconstruction and retooling of hothouse combines, 67 rubles 27 kopecks.

The strengthening of the material and technical base for the storage and processing of products is of great importance. For this purpose norms of specific capital investments for the reconstruction, retooling, expansion, and new construction of facilities for the storage of potatoes, vegetables, and fruits have been worked out. They take into account technological planning norms stemming from the need for the development of a base for processing, storage, and refrigerating facilities, improvement in the quality of processed fruit and vegetable products, and reduction in their losses during storage, as well as organization of industrial production, construction of fully prefabricated storage facilities from light metal structures, and so forth.

This common norm, on the average, in the USSR has been determined in the amount of 290 rubles 94 kopecks per ton, including for potato and vegetable storage facilities, 215 rubles 30 kopecks, and for fruit storage facilities, 544 rubles 20 kopecks, including for the reconstruction of potato and vegetable storage facilities, 128 rubles 50 kopecks per ton of increase in capacity and of fruit storage facilities, 411 rubles 40 kopecks respectively.

Norms of specific capital investments for the retooling, reconstruction, expansion, and new construction of plants for the production of canned fruits and vegetables, dried fruit, grapes, and quick-frozen products have been worked out and approved for the first time. They take into account expenditures on the construction of warehouses for finished products, packaging shops, and so forth. The proportion of the retooling and reconstruction of existing enterprises accepted in norms makes up more than 57 percent. Common norms for the production of canned goods have been determined in the amount of 406,000 rubles per million standard cans, including for reconstruction, 390,000 rubles, and for retooling, 314,000 rubles; for the production of dried fruit and grapes, 2,045 rubles per ton, and of quick-frozen products, 1,346 rubles.

Norms of specific capital investments for all food industry sectors have been worked out and approved. Individual norms have been set per unit of commissioned capacity, consolidated, per unit of increase and commissioning of capacity, and combined, per ruble of increase in commodity (gross) output. Norms of specific capital investments have been determined for the retooling, reconstruction, and expansion of existing enterprises and the construction of new enterprises. Combined norms of specific capital investments have been set in the following amounts (in rubles per ruble of increase in commodity [gross] output): sugar industry, 2.55; confectionery industry, 1.43; wine industry, 1.47; beer and nonalcoholic beverage industry, 1.92; baking industry, 1.80; vegetable oil extracting industry, 0.90; margarine industry, 0.74; tobacco industry, 0.90; perfumery and cosmetics industry, 0.97; starch hydrolysis industry, 0.87; food concentrate industry, 0.48; macaroni industry, 0.96; yeast industry, 3.20; salt industry, 6.30; essential oil industry, 0.42; soap making industry, 1.76; mineral water bottling, 1.90; production of packaging and corking articles, 0.81. On the whole, in the food industry the combined norm of specific capital investments has been determined in the amount of 1.19 rubles per ruble of increase in commodity (gross) output.

Norms of specific capital investments for the initial processing of bast fiber, cotton, and wool have been worked out for the first time. Initial flax

processing norms envisage the utilization of highly productive, new equipment and take into account an increase in social requirements for industrial buildings in terms of comfort, the production standard, and environmental protection. The consolidated norm of specific capital investments for the initial processing of bast fibers totals 3,448 rubles per ton of flax fiber and the combined norm, 1.25 rubles per ruble of increase in output.

Norms of specific capital investments for cotton cleaning industry enterprises have been worked out with due regard for the introduction of efficient, new types of equipment and the development on their basis of flow lines changing raw cotton processing technology. The consolidated norm of specific capital investments for initial cotton processing, on the whole, totals 320 rubles per ton of commissioning of a capacity (which is 19 percent lower than those previously in effect), including for retooling, 217 rubles, and the combined norm, 0.147 rubles per ruble of increase in output, including for retooling, 0.104 rubles. Their value is 17 percent lower than the norms of the 11th Five-Year Plan.

Norms of specific capital investments for initial wool processing take into account the utilization of modern equipment of Soviet-Polish production. Consolidated norms of specific capital investments for initial wool processing have been set in the amount of 967 rubles per ton of scoured wool, including for reconstruction, 819 rubles, and the combined norm, 0.18 rubles per ruble of increase in output.

Norms of specific capital investments for land reclamation take into account the entire set of operations envisaged by the consolidated estimate of the plan for reclamation construction irrespective of financing sources (except for state budget financing for operating costs) with due regard for existing territorial-climatic and seismic coefficients, including the cost of projects for the operating service. Norms for the construction of irrigation systems single out rice and catchwork, drop, and sewage irrigation systems and irrigated pastures and hayfields.

Consolidated norms of specific capital investments are distinguished according to systems. For example, for rice irrigation systems in the Kazakh SSR, the Turkmen SSR, and the North Caucasian Economic Region they total 5,400 to 5,600 rubles per hectare and in the Uzbek SSR, the Tajik SSR, and the Volga Economic Region, 6,100 to 6,900 rubles. The consolidated norm of specific capital investments for the construction of catchwork irrigation systems has been set for the basic zones of their application within 630 to 690 rubles per hectare and of drop and intrasoil irrigation systems, 620 to 690 rubles.

Norms depending on the drying method--by open channels and closed drainage--have been determined for the construction of drainage systems. Norms for drainage-moistening systems, as well as for the construction of polder systems (machine drainage systems), have been set. Norms for irrigation from underground water sources, as well as for the construction of operating service projects, have been determined.

Norms of specific capital investments in rural construction, when reclaimed land is developed, represent expenditures on the creation of fixed capital of

agricultural enterprises developing irrigated (drained) land. They have been set with due regard for farm specialization and expenditures connected with the production of agricultural products on irrigated (drained) land and with the construction of projects for production and nonproduction purposes necessary for a highly efficient utilization of reclaimed land put into operation. For example, according to norms, the construction of sovkhoses of rice specialization requires from 3,000 to 4,000 rubles per hectare in basic rice production regions and in the Far Eastern Economic Region, 4,980 rubles; of sovkhoses of grain and animal husbandry specialization, 3,600 to 4,200 rubles, of vegetable and dairy specialization, 7,100 to 7,800 rubles, of viticultural specialization, 12,400 to 13,200 rubles, and of horticultural specialization, 10,800 to 12,300 rubles per hectare.

Let us examine the norms of sectors for the production and processing of livestock products. The norms of specific capital investments for the development of cattle farms and complexes deserve attention. For the 11th Five-Year Plan only individual norms for new construction were approved, but for the 12th Five-Year Plan, consolidated and common norms as well. The distinctive feature of norms lies in the fact that as a supplement to them the utilization of coefficients is recommended, taking into account the effect of scientific and technical progress and the organization of construction during the current five-year plan. Consolidated norms of specific capital investments for the new construction of cattle sections and complexes according to specializations, on the average, in the USSR in the following amounts (rubles per place for livestock) have been set: dairy specialization, 2,649 rubles; fattening specialization, 1,148 rubles; young replacement stock raising, 1,149 rubles; pedigree specialization, 2,084 rubles; hog breeding sections with a completed production cycle, 567 rubles; reproduction specialization, 1,253 rubles; fattening specialization, 469 rubles; pedigree specialization, 856 rubles. Similar norms have been worked out for the reconstruction and retooling of sections and complexes. They are the most effective, because expenditures on these purposes are 80 to 85 percent lower than on new construction. This has made it possible to lower the common norms of specific capital investments for the development of animal husbandry to 955 rubles per place for livestock and in hog breeding, to 476 rubles.

Norms of specific capital investments for the dairy industry envisage the output of products of an expanded assortment and the introduction of waste-free production technology with a full and overall utilization of raw materials. A shop of a 5-ton capacity per shift which produces liquid and pasty dairy products for children up to 1 year of age has been planned for the first time at dairy combines of a capacity of 150 tons of whole milk products per shift. Volume-planning solutions of production buildings are based on the planning of shops and the sectional principle of arrangement, which make it possible, when necessary, to change the capacity of shops and production facilities. Highly productive domestic equipment with a high degree of production mechanization and automation is envisaged at combines. Consolidated norms of specific capital investments have been determined in the following amounts (in thousand rubles per ton per shift): for whole milk production (in terms of milk), 52.7; for cheese making production, 1,854.5; for dry skim milk, whole milk substitute, and dry whey production, 845.9; for dry baby product and dry whole milk production, 2,923.4; for canned milk



production, 171.7. Combined indicators of specific capital investments totaled 0.974 rubles per ruble of increase in output.

Norms of specific capital investments for the meat industry take into account leading types of meat combines and meat processing plants. Norms for meat-fat, meat processing, and refrigerator production are singled out in the structure of meat combines. On the whole, consolidated norms of specific capital investments for meat production total 162,000 rubles per ton of meat per shift, for cooked meats production, 577,000 rubles per ton of cooked meats per shift, and for refrigerators, 3,360 rubles per ton of standard capacity.

Norms of specific capital investments for the construction of dwelling houses and municipal service projects on kolkhozes and sovkhoses take into account the structure of housing construction in the Union republics according to wall materials (brick, large-panel, large-block, monolithic, wooden, and so forth), the proportion of the construction of sectional and homestead houses, and the level of their engineering support. Norms of specific capital investments have been worked out with due regard for the cost of construction of farm structures (for keeping animals, poultry, and implements) and without them.

When the norm plan was coordinated, the following factors affecting an unsubstantiated increase in the cost of construction were excluded: replacement of materials, articles, and structures envisaged by plans with more expensive ones; inefficient long-distance transportation of materials, parts, and structures; errors by surveyors and planning organizations; overstating, as compared with existing norms, areas of farm buildings and so forth. As a result, norms of specific capital investments have been lowered by 12 percent, on the average. In individual Union republics the consolidated norm of specific capital investments for the construction of dwelling houses with farm buildings ranged from 290 rubles per square meter of the given total area (Azerbaijan SSR and Tajik SSR) to 343 rubles (RSFSR) or 360 rubles (Lithuanian SSR).

Norms of specific capital investments for the construction of intrafarm roads are differentiated according to the technical category, locality relief, and types of surfaces. Correction coefficients for new construction, by means of which road construction norms are set, have also been given.

In connection with the adopted procedure of the planning of the agro-industrial complex as a single whole there is a need to determine the combined norms of specific capital investments for an increase in the production of final products of the agro-industrial complex, which requires the development of methodological approaches. It is important to set combined norms of specific capital investments encompassing all APK links--from the production of agricultural raw materials to the supply of finished food products for consumers.

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## REGIONAL DEVELOPMENT

### S & T SUPPORT SOUGHT FOR ACCELERATING GEORGIAN APK DEVELOPMENT

Tbilisi ZARYA VOSTOKA in Russian 13 Oct 86 p 2

[Article by Valeryan Metreveli, deputy chairman of the Georgian SSR Gosagroprom, chairman of the presidium of the regional department of VASKhNIL, academician: "The Scientific Search for High Efficiency"; first paragraph is ZARYA VOSTOKA introduction]

[Text] "In the course of rapid scientific and technical progress, it is intellectual and scientific potential, which is inexhaustible in its nature, that becomes society's most important resource. The solution of historical acceleration problems largely depends on a correct, assiduous, and efficient utilization of this potential." These words expressed by Mikhail Sergeyevich Gorbachev at the All-Union Conference of Heads of Social Science Departments can also be fully applied to agrarian science.

Large-scale measures aimed at improving the administration and economic mechanism of management of the APK and accelerating the rates of scientific and technical progress in all its sectors are now being realized in our republic. In connection with this there is an urgent need to restructure the entire system of scientific support for the development of the republic's APK.

The very process of integration of agricultural production and the processing industry has confronted us with the need to examine the problems of planning scientific support for the development of the entire agroprom as a single overall system.

With due regard for these circumstances an overall program for scientific support for APK development for 1986-1990 has been developed and approved by the boards of the republic's Gosagroprom and the Georgian SSR State Committee for Science and Technology and by presidiums of the Georgian SSR Academy of Sciences and the regional department of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin.

According to the program, the volume of scientific research and design work totals 65 million rubles and, according to preliminary estimates, the economic effect from the introduction of research results into production is expected to total 334 million rubles.

As compared with the preceding five-year plan, the return on every ruble invested in scientific research increases 1.8-fold. At the same time, they will contribute to a 16-percent labor productivity growth and to lowering the proportion of manual labor in agricultural production from 71.6 percent (1985 level) to 64 percent.

The June Plenum of the CPSU Central Committee pointedly raised the problem of accelerating the reconstruction and technical renovation and retooling of existing enterprises on the basis of the introduction of the achievements of science and technology and the transfer of production to the tracks of intensive development. These problems are now in the center of attention of our agrarian scientific research and design and technological institutes. Scientific associates jointly with specialists of appropriate production subdivisions of the republic's State Agroindustrial Committee are developing measures to reconstruct and retool all APK sectors.

The program for retooling meat and dairy industry enterprises has already been drawn up. It has been approved by the board of the republic's Gosagroprom and its realization has begun. We assume that similar scientifically substantiated programs for retooling specific APK sectors, whose development is being completed, will perform their organizational function in the fight for an improvement in the quality of output and, at the same time, for an increase in the economic efficiency of production and will prevent such negative phenomena as an inefficient utilization of fixed capital.

An analysis of the situation that has been created makes it clear that work on economic contract subjects performed by scientific research institutes of various departments requires a fundamental restructuring. At present more than 250 such subjects are being worked out. Most of them are topical and highly effective. However, subjects having no prospects and of no practical importance are still encountered. Cases when supervisors of contract subjects handle their development with insufficient responsibility and limit themselves only to general recommendations have not been eliminated. It is clear that such superficially performed "scientific" work is of little use. That is why at present we have developed a new form of planning and reporting economic contract subjects. Measures to further expand the volume of work proceeding primarily from production needs and requirements will be implemented in the near future. A new standard form of concluding contracts, which envisages an increase in the responsibility of organizations (developers) executing a subject for research efficiency and, subsequently, for the introduction of developments into production, has been worked out. In case the economic effect based on the concluded contract is not obtained, the executing organization should refund all the unjustifiably incurred expenses to the client. We assume that the terms of the contract will sharply improve the quality of research and accelerate the introduction of innovations.

There are also many new things at design and technological institutes of the republic's State Agroindustrial Committee. At present they have been transferred to cost accounting and the planning of their work is basically done according to the "order-assignment" principle. Next year this principle

will also be adopted by a number of scientific research institutes, institutions, organizations, and centers (scientific laboratories, divisions, and so forth).

We have studied the problem of establishing, under the republic's conditions, scientific and technical centers, scientific production associations, and intersectorial complexes on the basis of scientific research institutes and experimental stations. The practical realization of the envisaged measures has already begun. It is necessary to note that newly established associations will operate according to the principle of the closed "research-production test-introduction" cycle.

Temporary creative scientific collectives represent one of the efficient organizational forms of accelerating the development and introduction of individual problem matters into production. Such a collective has already been established at the Tbilmoloko Production Association. It is developing a technology for the production of a milk substitute for feeding calves. An analysis of calculations shows that, as a result of the introduction of this technology, no less than 35,000 to 40,000 tons of whole milk will be saved at the dairy sections of the republic's public farms. Similar creative collectives of departments of educational institutions and scientific research institutes will also be established at other enterprises and at a number of RAPO.

Despite certain achievements in the matter of introduction of innovations into production, simultaneously with restructuring the activity of scientific research and design and technological institutes and institutions, there is an urgent need to fundamentally restructure the entire introduction system. Today not only production workers and developers should specifically engage in work on introduction.

To accelerate the introduction of scientific developments for the purpose of providing practical assistance to production workers, cost accounting scientific production divisions or scientific and technical centers for introduction are being established at scientific research institutions. However, this does not at all relieve managers and specialists of enterprises, RAPO with their divisions and groups for introduction, and sectorial Gosagroprom subdivisions of responsibility.

Experience will show that an extensive introduction of intensive technologies and of the collective contract is the most important condition for the further improvement in the economic mechanism of management of agricultural production. By the end of the five-year plan, as compared with 1985, intensive areas in the republic are to be increased almost fivefold. This obligates both scientists and production workers to strictly observe the requirements of existing recommendations for this technology, because individual cases of their gross violations have not yet been eliminated. Unfortunately, a number of farms plan the production of grain crops according to intensive technology without taking into account the reality of implementation of all the necessary and additional agrotechnical measures. As a result of such an approach to this matter, the farm deprives itself of the possibility of obtaining the programmed grain harvest and discredits a very

important state matter. To avoid this, it is necessary in advance, jointly with specialists of scientific research institutes, to select suitable irrigated land plots and to outline and implement all the necessary agrotechnical measures. It is also necessary, with the help of scientific research institutes, to organize on advanced farms courses for improvement in the skills of specialists directly engaged in the production of grain crops under conditions of intensive technology.

A total of 5,800 brigades and links now work according to the collective contract principle at agricultural enterprises. The family contract is being successfully introduced and the scale of introduction of intracost accounting is expanding on most farms in the republic's high-mountain zone. Despite this, a number of farms still underestimate the positive aspects of these measures, which was discussed at the 3d Plenum of the Central Committee of the Communist Party of Georgia.

For the purpose of eliminating shortcomings in this matter, the Georgian SSR Gosagroprom has developed a specific 2-year program, broken down by rayons, for the introduction of intensive technologies, cost accounting, and the collective contract, according to which in plant growing and animal husbandry all brigades should be basically transferred to the contract method during the aforesaid period. To provide practical assistance to farms in this work, a single cost accounting planning and technological center for the development and introduction of advanced forms of labor and wage organization has been established on the basis of four "centers for scientific labor organization."

In 1985 the republic's scientific research and higher educational institutions of agricultural and allied specialization developed "scientifically substantiated farming systems." Unfortunately, their practical application is difficult, because the republic's land use zones sharply differ from each other in their soil and climatic properties and natural and ecological specificity. It is impossible to utilize averaged republic agrotechnical standards in all zones without an appropriate correction. Therefore, there is an urgent need to develop appropriate zonal farming management systems on the basis of specific data on typical farms and rayons. Such have already been developed and in the next few days RAPO will receive them for further practical application.

In the republic, with due regard for the soil and climatic conditions of sectors, 22 base farms (including processing enterprises) have been assigned for the performance of checks under production conditions and generalization of the results of utilization of new technological methods, technical facilities, and advanced wage forms. Unfortunately, a number of RAPO do not pay proper attention to these farms and do not give them the necessary assistance. Yet these farms are the true centers of scientific and technical progress and advanced experience.

There is another matter. Three of the republic's higher educational institutions now train highly skilled specialists in more than 25 fields, basically in narrow specialties, as a result of which it is very difficult to adapt them under production conditions in accordance with the requirements of scientific and technical progress. For all that higher educational

institutions, on the whole, turning out specialists in an excessive number, do not train them at all in certain specialties (biotechnology, production management, processing industry, and so forth). All this once again stresses the need to fundamentally restructure the system of training agricultural personnel by unifying allied sectorial specialties with a simultaneous expansion of the training of specialists of broad specialization.

At present, improvement in skills on a full-time basis takes place at higher educational institutions of agricultural specialization, where training is carried out basically according to programs developed 15 to 20 years ago. Unquestionably, such a system of retraining specialists no longer meets the demands of the times. It is necessary to transfer the retraining of specialists on a full-time basis to goal-oriented program training with a simultaneous extension of practical production skills and to organize training on a part-time basis in localities and at best, under the conditions of base enterprises and experimental farms of scientific research institutes.

Naturally, the most rapid solution of these and other problems will have the most positive effect on the further intensification of all the sectors of the republic's agroindustrial complex on the basis of the achievements of scientific and technical progress.

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## MAJOR CROP PROGRESS, WEATHER REPORTS

### CONDITION OF PERENNIAL GRASSES IN UKRAINE

Kiev SILSKI VISTI in Ukrainian 29 Oct 86 p 1

[Article prepared by the Department of Feed Production of the UkSSR Derzhagro-prom; the Ukrainian Scientific-Research Institute of Crop Farming; and the Ukrainian Scientific--Research Institute of Feed under the rubric "Timely Advice": "Statistical Survey of Perennial Grasses"]

[Text] Due to a rainfall deficit and high atmospheric temperatures during the first part of the summer, perennial grasses sown this year in many of the oblasts of the republic exhibited poor tegumentary qualities and signs of thinning. In the northern and western oblasts rains during the middle of summer made it possible to sow grasses in the summertime; but in the southern and southeastern oblasts drought occurred later on. That is why in dry zone areas where crops are cultivated without irrigation the situation here regarding environmental factors became rather complicated. So then we need to exercise care and diligence when inspecting the crops, keeping in mind that the goal is to provide good wintering.

In order to raise the level of winter-hardiness and preserve leguminous grasses, it is a good idea to treat them with phosphate and potash fertilizers. It is especially important that we turn our attention to this year's crops. Meadow clover should be treated with proper dosages of 30 and 45 kilograms per hectare; alfalfa and cereal-leguminous grasses, but legumes in particular, require 45-60 and 60-90 kilograms. Nitric fertilizer should not be applied to leguminous grasses in the fall, since this tends to reduce the level of winter-hardiness. In clean sowing areas cereal grasses need to be treated with phosphate-potash fertilizers along with a small amount of nitrogen--applying 30 to 40 kilograms of the substance per hectare. In the fall cereal grasses can also be treated with anhydrous ammonia or with a combination liquid-type of fertilizer, undiluted amounts of fermion, or a mixture of fermion and water in a 1:5 ratio.

With respect to grasses in their first year of life, cattle should not be permitted to graze, since this would sharply reduce the number of vegetative sprouts which give yields the following year. In places where perennial crops have not yet been cut, they have grown by another 25-30 centimeters; these should be cut without delay using combines E-280, E-301, leaving 8-10 centimeters of the crop above ground. Stubble, in addition to an increased supply of

nutrients, will be a contributing factor towards snow-retention. And this becomes extremely important for those dry forest-steppe and steppe regions. With regard to alfalfa crops in their second year of life or more, in heavy soils, especially on irrigated land, small trenches are cut to a depth of 35-40 centimeters with a distance of 1.4-2.1 meters between them. This is a highly effective measure for perennial grasses which occur in sloping areas, in places where ponding occurs, or in areas containing micro-depressions. Where the water tends to stagnate plants are reduced in number. The practice of cutting these small trenches is done late in the fall up until the time the ground becomes frozen.

If a moisture deficiency occurs in the steppe soils and in irrigated lands under perennial grasses, the areas are sprinkled with water (assuming this has not been done previously): the norm being 600-800 cu. meters per hectare; in the forest-steppe regions it is 500-600 cu. meters per hectare.

During the fall-winter period crops of perennial grasses sustain considerable damage from mouse-like rodents. In the fall post-harvest scrappings are gathered up from the fields and disposed of. The mice are destroyed by dispersing poisoned bait or by flooding holes with ammonia water.

In the fall an inventory is taken of the grasses; then in the spring those areas that require restoration or that have to be resown are given special consideration. Furthermore, during the autumn period the annual optimal density of clover and alfalfa crops is figured at 250-300 plants per square meter. If crop density varies somewhere between 60-70 percent from the optimum, then restoration of these crops will be required.

Under long-term intensive cultivation of alfalfa, which is sown on non-fertile soil or soil deficient in organic matter after predecessor crops, it is necessary to apply 50-60 tons of manure per hectare and 90 kilograms of phosphate-potash fertilizers. In woodland areas during fall plowing of winter fallow where clover is sown, a 0.75-1 dosage of hydrated lime is applied to the cover and 1-1.5 dosage for alfalfa.

To raise the level of feed production, natural agricultural lands should be utilized more extensively. Hay fields and pastures, with soils rich in mineral content and with good, natural or sown grass stands, during favorable weather conditions become a fine source of fertilizer for the grasses. This will mean better wintering for the grasses and cause more rapid growth in the spring--producing higher yields during the first harvest or during the cattle grazing cycle.

In meadowlands where leguminous plants predominate phosphate-potash fertilizers are applied in the recommended norm. If the majority of the plants happen to be cereals, nitrogen is applied in doses of 45-60 kilograms per hectare. In flooded meadows, which remain inundated over a period of 35-40 days in the spring, this work can then be continued to the end of October; but during warm weather the work can extend through the 10-15th of November. On hay fields and pastures that are not affected by high-flood waters, the grass stands can be treated until it snows.



Hay fields and pastures are also treated with both ammonia water and anhydrous ammonia. Most of these fertilizers are applied to the sod of heavy soil to a depth of 80 centimeters--for light soil it is 10-14 centimeters; at the same time the small trenches are covered over by the use of a roller. The distance between the working apparatuses of the cultivator that inject liquid nitrogen into the soil is 30-35 centimeters in pastures; on single-slope and double slope hay fields the distance is 45-60 centimeters.

On hay fields and pastures developed on drained lands consisting of turf, it is essential to install a mole drainage system for the purpose of enhancing hydro-atmospheric and climatic conditions. In meadow areas it is recommended that this system be renewed every three years. In the steppes and forest-steppes, where erosion is prevalent on slopes and the grass stand has deteriorated, during the autumn period small trenches are cut a depth of 35 centimeters across the slopes. The distance between the trenches is one meter.

In low-yielding hay fields and pastures where erosion does not occur, the area is prepared for the cultivation of meadowland for the following year. In these meadows, after the sod has been sufficiently disc harrowed, fall plowing of winter fallow begins: on sandy topsoil it is done to a depth of 20-22 centimeters, but no deeper than the humus horizon; for turf it is 25-27 centimeters.

This year we have to improve the conditions of cattle enclosures and roads to pasture in those areas that are going to be cultivated for grazing.

Special attention is given to the breeders of perennial grasses. During the fall-winter and spring periods, in addition to the measures cited above, a thorough inventory is taken of the sown areas. In the fall or early spring in areas where leguminous grasses occur, mineral fertilizers are utilized; furthermore, 60 kilograms of the active element phosphorous and the same amount of potassium is applied per hectare. In the early spring sown areas of cereal grasses are treated with nitric fertilizers--applying 60 kilograms of the active substance per hectare.

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## MAJOR CROP PROGRESS, WEATHER REPORTS

### SEED SITUATION FOR 1987 CROP IN UKRAINE

Kiev SILSKI VISTI in Ukrainian 30 Oct 86 p 1

[Article by B. Demchenko, director of the Department of Seed Production of the UkSSR Derzhagroprom: "What Kind of Seed Is in the Grain Bins?" followed by the heading "The True Farmer Is the One Who Starts Preparing Sowing Material in the Fall"]

[Text] Many years of practical experience has shown that proper, preparative seed-growing is above all the most reliable and effective method for ensuring an abundant harvest and for increasing gross yields of field crops. The potentialities of a particular variety become most apparent only when the seed is of a high sowing quality. None of the available agrotechnical measures is likely to produce the desired effect if the sowing material is of a poor quality.

When 3rd-class seed is used, the plants show poor development, the result being a harvest shortfall--3 to 5 centners per hectare.

For spring sowing the collective and state farms in the republic for the most part have an ample supply of seed for their own production. Necessary insurance funds have been made available. However, not all farms tended to the business of preparing sowing material in the way of oats, millet, and legumes.

Only that seed which has been thoroughly and carefully cleaned and checked for quality via state seed inspection can be considered ready for sowing.

Farms in the Chernovtsy, Khmel'nitskiy, Dnepropetrovsk, Sumy, and Donetsk oblasts are doing a fine job concerning the preparation of sowing materials; they have in their possession 83-100 percent 1st-class seed. This is a result from the fact that many collective and state farms have started preparing seed right at harvest time; they have formed permanent teams and brigades which have successfully worked according to schedule in 2-3 shifts; in addition, they've utilized maximum seed-purifying technology.

Still, on a number of farms this work has been delayed. In the Zhitomir, Chernigov, Ivano-Frankovsk, and Poltava oblasts grain bins containing 1st-class seed are only about half full.

Up to this time in the Ruzhynskiy and Radomyshliskiy rayons of the Zhitomir Oblast farms have not presently been engaged in the preparation of spring seed due to the fact that there are not enough grain cleaners to do the work. Only a third of the seed stock can be classified as 1st-class.

Here are the names of the collective farms that are without 1st-class seed: "Pravda" in the Borivskiy Rayon of the Kharkov Oblast; "40 rokiv Zhovtnya"--Beryslavskiy Rayon, Kherson Oblast; "Bilshovyk"--Ananyivskiy Rayon; and "Pravda"--Krasnooknyanskiy Rayon, Odessa Oblast. This we can attribute to a lack of control from the side of RAPO [rayon agro-industrial association] specialists. They neglected to do their work according to schedule.

It is the obligation of workers from the grain-receiving enterprises of the republic to give sufficient aid to the farmers. Farms have received thousands of tons of seed from state resources. It is vital that the preparations begin without delay. As for now, the quality of sowing material procured by purchases officers is considerably poorer than of that found on collective and state farms.

In order to raise the level of grain yields it is important to introduce new high-yielding varieties for production. If we take into account the rapid development of these varieties, each hectare can be expected to yield an additional 2-2.5 centners of grain. In the last few years plant breeders have obtained many new varieties. For example, from the 17 varieties of spring barley we have: 7 characterized as resistant to drought and 12 resistant to lodging. But the disadvantage is that among the different varieties not one exhibits group resistance to diseases and pests. Only 2 varieties of peas out of 13 are resistant to aschochytose, rust, and powdery dew; 7 varieties exhibit resistance to shattering.

But still no variety exists which could combine the best qualities to form high resistance to agro-ecological conditions of crop cultivation, to pests and diseases, and to natural biological plasticity in connection with drought and disturbances due to hydrothermal conditions. The most pressing need in each of the soil-climatic zones is to furnish the rayons with a wide selection of genetically heterogeneous varieties possessing different maturation rates and high adaptive qualities--of the intensive and also non-intensive type; and finally varieties with high indicators of ecological plasticity.

The current trend is aimed at the restructuring of scientific-research establishments and the revamping of strain-testing methodology.

There is a deficit in corn seed production. The cultivation of male-type of hybrids is being carried on at scientific-research establishments on collective and state farms; however, preparing the seed material for sowing is a task handled by the corn-production plants of the Ministry of Grain Produce of the UkSSR. Unfortunately, its base of technology has been outdated and in need of serious revision. The output of 1st-class seed here has reached only to a level of 60-63 percent.

It is rather disturbing that during this year's 9-month plan Ukragrobud [Ukrainian Agro-Construction] failed to put into operation 18 start-up facilities in the branch of seed production. In the Voroshilovgrad, Zhitomir, Nikolayev, Odessa, Kehrson, and Khmel'nitskiy oblasts no systematic plan to prepare similar facilities has been drawn up. Neither has any serious attention been given to the matter of establishing a material-technical base on special seed-growing farms for the following oblasts: Zaporozhye, Ivano-Frankovsk, Poltava, Sumy, and Chernigov. There has also been a delay in the construction of plants designed for the development of male-type corn hybrids in the elite seed-growing state farms imeni "Zhdanov" in the Vinnitsa Oblast and imeni "9 Sichnya Poltavskoho NVO 'Elita'"; in the seed-producing farms of the Ukrainian Scientific-Research Institute of Plant-Growing, Selection, and Genetics imeni V.Ya. Yuryeva, and others. Consequently, only 16 of the 43 plants are in operation.

In individual RAPO's and oblagroproms [oblast agronomical industries] seed-growing type of work has not been completed either. This has had a negative effect on the development of seed production. Taking into account zonal territories of the republic and the vast increases in seed material demands in other regions of the country, plus those designated for export, seed production should not be totally measured in the framework of rayons and oblasts. All questions pertaining to seed production should be viewed in light of a centralized plan that would provide the opportunity to meet state requirements for the procurement of seed material at any given moment.

In November the oblast commissions on strain-testing will be conducting a series of meetings. The question of the regionalization of new varieties needs to be discussed in full detail, i.e., which of the varieties would be better able to adapt to ecological factors of the environment. This would have a positive influence on the production of seed and establish it as an industrial base.

Now in connection with circumstances surrounding winter fields--it is important to give special attention to the preservation of seed, that is, to invest it in transferable stocks. In addition, where it is necessary we need to organize the selection and cleaning of the commercial portion of grain and establish an interhospodarstvo [serving several farms] exchange. And we must not forget the importance of well-timed sterilization and incrustation of seed material.

In the coming spring season land under spring crops will be greatly expanded; therefore, our main concern at this point is the preparation of corn seed.

The plan for the procurement of hybrid corn seed for state resources this year has been fulfilled; its quality has improved over last year's. Still, the work is only half done. The task of RAPO council, oblast agro-industrial committees, grain-receiving enterprises, and corn calibrating stations is this: to organize work in a way that ensures prompt preparation of seed material, so as not to allow its sowing quality to deteriorate.

13006/7358

CSO: 1811/006

## LIVESTOCK AND FEED PROCUREMENT

### IRRIGATION INACTION LIMITING KASSR ANIMAL HUSBANDRY

[Editorial Report] Alma-Ata QAZAQ ADEBIYETI in Kazakh on 25 July carries on pages 2-3 an 1,800-word article by Mamytbek Qaldybayev, writer, published under the rubric "Questions to Look into," entitled "What Conditions are the Pastures in?" The article looks in detail at water shortage and animal husbandry in Dzhezdinskiy Rayon (Dzhezkazgan Oblast), which is highly arid, virtually useless for crop growing and the economy of which is by and large based upon the few sheep and other livestock which can be supported by 3,000 hectares--1 percent of rayon lands--of pasture.

Qaldybayev suggests, however, that much more could be accomplished and even a little water to irrigated pastures--water available from a careful husbanding of local resources--would go a long way. He, moreover, goes on to say that the real problem is not water shortage in this case but a failure by the authorities to make quick irrigation decisions and to carry out those which have been made efficiently, with full consideration given to local conditions and needs. In this case, he goes on, indecision by the authorities is limiting the food program.

An editorial note concludes that the problems of Dzhezdinskiy Rayon are by no means unique and in fact are symptomatic of difficulties being encountered in building up animal husbandry in arid and semi-arid parts of the republic in general. Quick decisions in this area are called for.

9857/7358

CSO: 1832/402

## FUELS

UDC 338.45:622.276

### USSR OIL MINISTER REVIEWS INDUSTRY

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 10, Oct 86 pp 3-16

[Article by V. A. Dinkov, Minister of the Oil Industry under the "Decisions of the 27th CPSU Congress Into Life!" rubric: "Activating the Work of the Sector's Economic Service"]

[Text] The Soviet Union has entered into a critical stage in its development, a stage which is characterized by profound changes in the content and nature of labor, by signal improvements in the people's material and spiritual living conditions and by a substantial stirring up of their labor activity.

On this particular path, the decisive condition needed to achieve the goals set by the 27th CPSU Congress will be: the constant and unswerving raising of the consciousness and creative initiative of the laborers, the increasing of their motivation and responsibility, expansion of the rights of the labor collectives vis-a-vis the administration of production, and the solving of an entire complex of social and economic problems.

The Soviet government has at its disposal everything necessary to bring these grandiose plans to fruition, and everything which is vitally important to the skillful disposition of this wealth.

The petroleum industry is one of the key sectors of the fuel-energy complex, and of the country's national economy as a whole. Thanks to the constant attention and great help of the party and the government, as well as the selfless labor of the entire Soviet people, the powerful potential of the petroleum industry has come into being.

At the same time, the petroleum industry was the subject of serious, albeit just, criticism at the 27th CPSU Congress. By and large throughout Minnefteprom [Ministry of the Petroleum Industry] the plan for oil recovery for the 11th Five-Year Plan period was not fulfilled, nor were the five-year plan's assignments for the volume of development well drilling, for capital investments or construction and installation jobs.

The last five-year plan period saw a worsening of basic economic indicators for the sector: labor productivity and the yield on capital both fell off, and there was a substantial increase in the proportionate capital investments needed to create one ton of new oil-recovery capacities.

One of the causes which brought this situation about was the negative tendencies in the state of the sector's raw materials base. The basic deposits have come into the stage at which oil recovery levels are falling off, and those which are being brought into development are characterized by lower productivity and thus require increased outlays to be developed.

However, an analysis which was conducted showed that the primary cause of the sector's lag was the fact that the measures needed to prepare for work in more complex conditions were taken too late.

Thus in the Tyumen Oblast fields, a serious lag was allowed to develop regarding the organization of the efforts needed to make the transition from flow production to mechanized production, the setting up of necessary capacities for well servicing and repair, construction of surface field facilities, maintenance of formation pressure and provision of a reliable power source for the fields. The stock of drilled well has been unsatisfactorily used. Efforts to develop new oil reserves have been carried out too slowly, and engineering and geological services in the fields have become slack.

There have been serious defects in the formation of stable skilled labor collectives of oil workers.

The sector has been extremely slow in solving problems related to the technical re-equipping of production. The achievements of scientific and technical progress have been introduced in totally inadequate volumes, they suffered from a poor degree of effectiveness and had no substantial impact on the dynamic of the economic indicators of the work being done by the petroleum industry.

The enterprises and associations showed a slackening in the economic efforts they made to effectively use existing potential and expendable resources. Employees of the economic services of certain organizations try to justify their not having taken measures which would have ensured increased labor productivity and reduced output production costs with references to the fact that mining and geological conditions related to field development have become more complicated. It is, however, in precisely these conditions that it is particularly important to stir up the efforts of the labor collectives to improve production efficiency, and thus to use these efforts to contrast the negative effect of the mining and geological factors which have become so complicated.

In the wake of the April 1985 CPSU Central Committee Plenum, the efforts of the labor collectives were aimed at overcoming the lag which had been allowed to come about, and at solving the problems related to developing the sector. The visit of CPSU Central Committee General Secretary M. S. Gorbachev to the Western Siberian fields acted as a powerful impetus to this effort, and was an event of special importance to the oil field workers.

In the Tyumen Oblast's oil producing enterprises, the volume of work done to more completely utilize existing capacities and accelerate the putting of new fields into production has been greatly increased, and measures have been taken to augment the work-force, to improve the manner and methods of their work and to improve discipline and responsibility. Considerably augmented labor and

material and technical resources have been brought in to assist the oil workers of this region. The result has been considerably increased oil recovery levels.

The Nizhnevartovskneftegaz Association, which is the largest such organization in the sector, reached its planned recovery level on 21 April, and fulfilled its monthly plan. The aggregate rates will make up for the lag which has been allowed since the beginning of the year, and will ensure the overfulfilling of the yearly plan by this association.

Glavtyumenneftegaz [Main Administration for Petroleum and Gas Production Tyumen Oblast] has begun fulfilling its daily oil recovery plan.

In April the Tomskneft Association made up completely for the lag which has existed since the first of the year, and came up to the above-plan level for oil recovery.

Successful work is being done by labor collectives of the Yuganskneftegaz, Surgutneftegaz, Komineft, Bashneft, Turkmenneft and other associations.

As a result of the measures it has taken, the petroleum sector as a whole went to daily oil production in August.

A trend toward improvement has been noticed in the economic indicators for the sector's work. Since April, monthly plans for output sales and labor productivity have been fulfilled.

For 8 months the sector's drilling enterprises have drilled over 1.6 million above-plan meters of producing and exploratory wells, thus increasing their volume of drilling jobs by 19.4 percent compared to the corresponding period for last year.

Coming up to planned recovery levels is an excellent foundation for the continued development of the sector during the 12th Five-Year Plan period in compliance with the tasks set forth in the decisions of the 27th CPSU Congress.

Oil and gas condensate recovery levels for the country as a whole need to reach 635 million t in 1990.

Continued development is slated for the petroleum industry in Western Siberia, the KaSSR and in the northern part of the European USSR during the five-year plan period which just began.

A complex of measures has been outlined relative to the extensive application of rational systems for developing oil fields, to improving the techniques and operational procedures used in drilling operations and in the operation of wells, improvements in their technical equipping, and measures related to the continued implementation of new methods for increasing the amount of oil recovered from the formations. It will be necessary, during this five-year plan period, to increase the interservice operating period of wells 1.8-fold, and to raise the level at which petroleum gas is used up to 91 percent, including Western Siberia--up to 90 percent.



The Minnefteprom plan for the 12th Five-Year Plan period has posed serious and intense tasks: to ensure oil with gas condensate recovery levels of 591 million t in 1990, with 57 billion m<sup>3</sup> of gas, thus increasing the petroleum gas level by 34.3 percent.

The growth rate for industrial output for the five-year plan period for Minnefteprom on the whole has been set at 104.5 percent, and this includes a 102.4 percent growth rate for the oil producing industry, a 129.2 percent growth rate for gas recovery and refining, 153 percent for machine building and 139.5 percent for special materials manufacture. Here, we need to keep in mind the worsening mining and geological conditions associated with developing the oil fields, by virtue of which fact 97 percent of the newly set up capacities are to be directed at making up for the dip in oil recovery levels, and which requires greater outlays of material, labor and power production resources for every million t of oil recovered.

One of the most important conditions for stabilizing recovery and ensuring steady operation in the oil industry at its present stage of development is the bringing of new reserves into development. Minnefteprom [Ministry of the Petroleum Industry] has begun to speed up this effort. Provision has been made, during this current five-year plan period, to bring 215 new fields into development, 77 of which are in Western Siberia.

In compliance with the decisions of the 27th Party Congress, there are plans to commence development of the Arkhangelsk Oblast and to reinforce the work being done at the Tengizskiy Field in Kazakhstan.

As before, Western Siberia is still the prime oil recovery area. It is foreseen that over 2/3 of overall Minnefteprom recovery will come from this area. Oil recovery is also increasing in Kazakhstan.

The remaining regions have been given the task of stabilizing their oil recovery, or of sharply retarding the rates in its decline.

Development well drilling volumes need to be increased 1.5-fold and more, compared to 1981-1985. As this takes place, the operating well stock will increase 1.5-fold by the end of the five-year plan period.

Plans call for 35 percent increase in the volume of exploratory wells drilled during this five-year plan compared to the 1985 level.

The overall volume of footage in 1990 should increase 1.6-fold against the 1985 volume.

As this happens, despite the increased average depth of the wells, and the increase in the volumes of footage in the complexly structured fields of the northern Tyumen Oblast, the Caspian Basin and the Arkhangelsk Oblast, it has been foreseen that there will be a 28.6 percent step-up in the speed of development well drilling, of 33 percent in the drilling of exploratory wells, and a 34.6 percent increase in the average footage made per drilling crew.

In order to set up new production capacities, and to help in the construction of housing and the sector's social welfare facilities, there is to be a 1.3-fold increase in the allocation of capital investments for construction and installation work than was allocated for the 11th Five-Year Plan period. Plans call for a 34 percent increase in new housing, a 2.6-fold increase in the construction of children's preschool facilities, a 1.7-fold increase in schools for children, a 3.3-fold jump in hospital construction, and a 1.5-fold increase in the number of polyclinics. The production volume for popular consumption goods needs to increase 1.8-fold by 1990, and the volume of paid services to the population is to increase 2-fold and more.

Completed estimates have shown that, using the equipment, production methods and organization of production which are presently available in the sector, a 2-3-fold increase in the labor, material-technical, and financial resources would be needed in the sector in order to carry out the volume of work planned for 1990, which work must be done in mining and geological conditions which have become far more complicated.

It is perfectly obvious that the national economy is in no position to allocate such resources to us. We cannot and we will not take this extensive route of development.

The fundamental course of our development has been determined by the decisions of the 27th Party Congress, and it consists in an accelerated transition to an intensive course of development based on the widespread introduction of the achievements of scientific and technical progress, and on improving the effectiveness of production.

Ye. K. Ligachev, who is a member of the CPSU Central Committee Politburo and secretary of the CPSU Central Committee, once again brought our attention to this fact during his visit to the Tatneft [Tatar Petroleum] Association enterprises.

The problems which have been placed before the petroleum industry can only be solved by sharply accelerating scientific and technical progress, and through a serious restructuring of all the economic work done within the sector's enterprises.

The basic directions for the efforts related to the technical development of the sector have all been concentrated in the Minnefteprom program for accelerating the sector's scientific and technical progress for the period up to the year 2000. Similar programs and the measures needed to ensure their execution have been developed by each individual association.

In addition, more than 60 different programs, which provide for the development and delivery of new highly efficient equipment to the enterprises, have been developed and confirmed on the sectorial and intersectorial levels (conjointly with allied ministries).

New scientific and production associations, which are involved with the techniques and production methods used in recovering oil and repairing wells, in drilling, and in the automation of production, have been set up in the capacity of organizational measures. Their purpose is to ensure the accelerated development, and to provide the testing and widespread industrial introduction of progressive technical equipment and production procedures within the sector. The intersectorial scientific and technical complex known as Nefteotdacha [Oil Recovery] has been set up.

The design of the five-year plan calls for intense assignments related to improving production efficiency by way of the comprehensive implementation of the achievements of scientific and technical progress throughout each subsector and direction in the work of Minnefteprom.

Thus in the area of prospecting jobs, we envisage about a 25 percent increase in the oil reserves planned for the five-year plan period, from the measures related to scientific and technical progress. In using new methods to increase the amount of oil recovered from the formations, and to improve the systems used to develop fields, we will recover an additional 205 million t of oil with gas condensate, against 100 million t for the 11th Five-Year Plan period. With regard to drilling operations, we anticipate the securing of an 80 percent increase in the footage volume by increasing our labor productivity, which will reduce the estimated cost per meter of footage by 6 percent and more.

Using the computations for the lay-out of the five-year plan, and as the result of implementing the progressive block-module method of constructing field facilities, we envisage a R1.1 billion reduction in the volume of capital investments.

In the estimates of the requirements for material and technical resources, in compliance with programs for scientific and technical progress, practically all the allowances have been tightened up. Specific demand quotas for 44 types of oil-field equipment have been reduced an average of 15 percent.

A large-scale complex of measures related to scientific and technical progress and of an organizational character have been aimed at making improvements in the way labor resources are used, at increasing labor productivity and expanding the influence of NTP [scientific and technical progress] on the level of production costs for the purpose of reducing the prime production cost.

Directors of production associations and scientific research institutes, and those working in the economic services must do everything necessary to organize the unconditional carrying out of our programs for scientific and technical development. They must look upon these programs as an integral part of the measures for bringing to fruition the course which the party has set relative to acceleration, intensification and effectiveness.

Each of our enterprises has extensive reserves and unused potentialities for increases in the production of output, and for more economic and efficient utilization of our resources. What is needed is a creative and businesslike approach to the business at hand, a competent engineering-oriented organization of labor and production and a mobilization of the initiative of our labor collectives in the execution of the tasks facing them.

The achievements of our leading production workers are a graphic demonstration of the kind of great potentialities which are connected with using the sector's internal resources. Excellent results have been attained by collectives of the Mirnenskiy UBR [Administration of Drilling Operations] Kuybyshevneft Association, the Ivano-Frankovskiy UBR's Ukrneft Association and the Surgutsk UBR No 2's Surgutneftegaz Association.

Responding to the Appeal of the CPSU Central Committee to the Workers of the Soviet Union, a number of collectives have come forth with valuable initiatives and innovations and have revised their initial obligations. Some brigades have taken on the obligation to fulfill the five-year plan in 4 or 4.5 years.

At the same time, the introduction of advanced equipment has had no noticeable effect on improving the effectiveness of the work done at a number of enterprises. For example, at the Azneft, Embaneft, Turkmenneft, Dagneft and quite a few other associations, where there have been a great number of accidents and a lot of defective drilling work, a large number of wells are being abandoned for technical reasons, after not having fulfilled their intended purposes.

Losses and unused reserves such as these are not found solely in the drilling organizations of the above-named areas. The oil-producing, transport, geophysical, gas-refining and other enterprises are in the same boat. The main part of the unproductive outlays and losses for 1985 were allowed by Glavtyumenneftegaz [Main Administration for Petroleum and Gas Production Tyumen Oblast] enterprises.

Let us correlate the extent of the reserves which have not been disposed of and the direct losses with the effect derived from the introduction of the achievements of scientific and technical progress, which has been provided for in the calculations for the draft of the five-year plan. There is a broad field of activity here for those who work in the sector's economic services. At each enterprise there exist great internal reserves which can be mobilized through the strengthening of economic work, and by improving the efficiency and practical thrust of this work.

The sector's enterprises and associations have both developed programs for strengthening their economic work for 1986-1990. These programs take in all subsectors and types of activity, and have as their objective the carrying out of concrete measures for improving production efficiency and for ensuring that the assignments for the 12th Five-Year Plan period are fulfilled and overfulfilled with regard to their economic indicators.

Association directors and their economic deputies need to take charge of this work and to participate in it personally. The success of executing the assignments for improving production efficiency will depend on how deeply and completely within the program existing reserves are found, and on the methods which are determined for their disposal.

The directive contained in the CPSU Central Committee Political Report, which says that the economic mechanism must not be limited to partial improvements, but that a radical reform is needed relates, to the utmost degree, to the oil industry.

The key principle to improving the economic mechanism is through enhancing the economic independence of the associations and enterprises while simultaneously raising their level of responsibility for the final results of their work, based on the introduction of genuine profit and loss cost accounting, self-support, self-financing and the establishment of a direct relationship of the collectives' income levels on how efficiently they work.

The workers of the sector's economic services have been given the primary task of developing concrete measures for a radical restructuring of the sectorial economic mechanism in compliance with the decisions of the 27th Party Congress. This is to be done on short notice; it is to be done using a critical analysis of the features peculiar to the petroleum industry, its present-day condition, and its prospects for development, and it is to be done in order to effect the transition of Minnefteprom enterprises over to the new conditions in which they will be managed.

A transition to self-repayment and self-financing will make it possible to set up an efficient counter-expenditure mechanism, though for this, it is necessary to ensure that all the sector's enterprises and associations operate at a profit.

Because of the extremely low level of the technology and organization of the drilling work in the Azneft and Embaneft associations, they have systematically been operating at a loss instead of at a profit, they are constantly forfeiting their own working capital and even have no sources from which to form incentive funds.

Minnefteprom is taking measures to discontinue the practice of redistributing plan assignments and profits when the savings effected by leading collectives are being allocated to make up for the overexpenditures which have been allowed by those enterprises which operate poorly.

Preparatory to changing over to new methods of economic management in all the sector's enterprises, there is a need to beef up the work on reducing the prime cost, on strengthening the economizing practices and on accelerating the rate of turnover of circulating capital, so that each enterprise covers its own outlays with its own in-house revenues.

The economic services of the central ministry apparatus need to examine, along with the science of this sector, the entire complex of questions connected with prices, rent payments, payments for productive capital, deductions for prospecting operations, and connected with the amounts of upcoming outlays and revenues within the cross-section of each association throughout the years of the 12th Five-Year Plan period. We should develop and assert stable and balanced plan assignments and norms in order to define, for each and every labor collective, its tasks and the conditions for receiving incentives upon their fulfillment or overfulfillment.

Some solution has to be found to these complicated problems preparatory to carrying out a radical economic reform in the sector's enterprises.

As a first step, it has been decided to change Minnefteprom enterprises over to the new economic management conditions on 1 Jan 1987. These conditions are analogous to the conditions of the large-scale economic experiment which is presently being conducted in a majority of industrial ministries. For the purposes of the practical treatment of all elements of the new management system, provision has been made to introduce them experimentally extremely quickly in the Yuganskneftegaz and Udmurtneft associations.

The finding of solutions to the entire complex of problems connected with restructuring the economic mechanism and improving production effectiveness requires a creative approach to this affair on the part of the economic services' workers.

In the decisions of the 27th CPSU Congress, the particular importance of growth in labor productivity to improvements in production efficiency was given particular emphasis.

It needs to be said frankly that the labor productivity situation in the oil industry is turning out to be serious. According to computations for the draft of the five-year plan, it is diminishing. The determining influence here is the complication of the mining and geological conditions for field development and primarily the reduced productivity of the wells. This, however, gives none of us, particularly the employees of the economic services, any justification for slacking off our vigilance with regard to this problem. By the same token, the wells' yield does not depend solely on mining and geological conditions nor on the level of production activity, i.e. the quality of formation exposing, the system used to stimulate it, and the degree of efficiency in the carrying out of the work to enhance the flow and to optimize the wells' operating schedule. The economists must insist stubbornly that the appropriate services take all necessary measures to overcome the negative effect of these mining and geological factors and to secure growth in labor productivity. To bring this about, they should use all the factors and potentialities: mechanization and automation of the production processes, reduction of the portion of work done manually, improvement of norm-setting and wages, consolidation of small-scale enterprises and their subdivisions, the combining of skills, the introduction of brigade forms and methods for organizing labor, the stirring up of the human factor and the development of creative initiative within the labor collectives.

Considering the demographic situation which exists in our country, it needs to be stated clearly that the problem of providing the sector with labor resources can only be solved by a radical increase in labor productivity in all of our various activities, by improving the way we utilize our labor resources. We must allow them to leave operating facilities and productions and send them to complete new ones.

An analysis of the manner in which labor resources have been used in areas with approximately identical working conditions revealed an extremely dissimilar picture.

Thus it is that in areas of the Urals the proportionate numerical strength of workers used to service a single well tallies up like this: 1.08 in Bashkiriya, 1.23 in Tatariya and 1.31 in Udmurtiya, with 1.40 in the Perm Oblast, and in the Volga area, in the Nizhnevolzhskneft Association: 2.2, in the Saratovneftegaz Association: 3.8, and in the southern areas you have Krasnodarneftegaz with 1.06 and Ukrneft with 2.8 maintenance personnel per well.

The situation is exactly the same on the drilling end. For example, in 1985 labor productivity for the Mirnensk UBR came to 330 m per man, but only 77 m per man for the Azneft Association, that is, to three-thirteenths as much. Here, of course, the difference in the mining and geographic conditions in Western Siberia and Azerbaijan also affected the figures. But even in the comparable conditions of the Tyumen Oblast, labor productivity in, for example, the Mezon UBR is almost half that for the Mirnenskiy UBR.

All this is evidence of the great reserves available for increasing labor productivity through the study and dissemination of the advanced experience of the leading collectives. The employees of the economic services ought to organize the practical utilization of this experience, should direct all their energy towards finding and putting measures into effect which will improve production efficiency and which will combat the inefficient utilization of resources. They should go about the placing of problems of improving production efficiency and eliminating existing defects before management and allied services with boldness and vigor.

In solving the problems of increasing labor productivity and bringing about improvements in the utilization of labor resources, there is a need to take into consideration the specific nature of the structure of the numbers of workers in the sector in which maintenance and subsidiary-auxiliary productions predominate.

Thus, of the entire numerical strength of Minnefteprom, production personnel, taken into account when calculating labor productivity, amount to 18 percent. They account for 20 percent of the total number in drilling and geological prospecting organizations, 6 percent in construction and planning organizations, and 56 percent in trade and the so-called non-industrial economies.

However, most of our measures are meant to increase the labor productivity of those who make up the basic production brigades vis-a-vis recovery and drilling. By no means slackening the attention we give to the labor productivity of the workers on basic production brigades, there is also a need to bolster the efforts to improve the ways in which we utilize labor resources in the subsidiary-auxiliary, and maintenance productions. There are large reserves here. The labor done in the subsidiary economies is poorly mechanized, poorly organized, they allow a great amount of idle time, and the workers are not used to their full labor capacity.

As to the scope of these reserves, we can judge that even if only by this fact. The Nizhnevolzhskneft [Lower Volga Petroleum Production] Association, preparatory to implementing experience gained in Belorussia, developed measures which would free 16.7 percent of its workforce (on the average throughout the association) for work elsewhere, and this included 28 percent of those working in subsidiary economies.

In our sector, the Nizhnevolzhskneft Association and the Privolzhskoye Main Oil Pipeline Administration undertook to implement the experience gained in the Belorussian experiment. These organizations developed measures for ensuring the transition to new wage rates and salaries of the post, which were raised within the limits of the existing wage fund by 15-20 percent, i.e. by virtue of having relieved a portion of the workers. In these two organizations alone, plans called for the freeing of about 3,500 persons. This however, did not necessarily lower the work quality or do anything to worsen the quality of the maintenance of the facilities serviced.

Automation is an important factor in the raising of labor productivity. Frequently it is carried out in a non-integrated fashion and fails to operate reliably. The result of this is that in a number of cases, worker numbers are not reduced, but increased by virtue of the workers needed to service and repair the automation equipment.

It has been planned to integrate the automation of sectorial facilities during the 12th Five-Year Plan period, so as to enhance the reliability of their trouble-free operation in order to reduce the number of service personnel to the minimum.

This work needs, first of all, to be done on the main oil pipelines and gas refineries, where the number of workers is unjustifiably high.

The economists need to pay special attention to the efficient organization of labor and production, and to the bringing of new management techniques to each shop, brigade and each employee, so that each worker, engineering and technical worker and office worker is made aware of the changes going on, and has everything he needs to do highly productive labor and is assured that his work will be evaluated and rewarded suitably.

In this connection, it might be a good idea to dwell in particular on the flaws of applying the coefficient of labor participation with regard to the brigade forms of organizing and stimulating labor. This method is not presently in use in all brigades, and is sometimes used in a merely formal way, wherein all workers are credited with an identical KTU [coefficient of labor participation] even though they have participated to differing degrees.

Substantial reserves for increasing labor productivity are connected with improvements in the organizational structures and dispensing with superfluous administrative links.

At present, the number of employees calculated per single enterprise and organization in a number of areas is unjustifiably low (Glavneftegazpererabotka [Main Administration for Oil and Gas Refining], and the Uzbekneft, Tomskneft, Dagneft associations and others). In the Dagneft Association, eight enterprises employ less than 100 persons.



There are a large number of small-scale enterprises within the Azneft Association, where 92 enterprises, of which 22 have less than 100 workers apiece, are involved in recovering some 3.9 million t of oil and gas condensate. The small-scale organizations operate with a low yield, and are unable to operate at a profit. These organizations employ a very high proportion of ITR [engineering and technical personnel] and white collar workers (over 22 percent). However, the association has made no suggestions on ways to improve the administrative structure, to consolidate the small-scale enterprises into the larger economies, which are capable of efficiently solving the problems facing them. What's more, this association has proposed the setting up of an additional three small-scale construction organizations and two drilling trusts (while retaining the 7 existing drilling operations administrations at a footage volume of 420,000 m.

Unfortunately, such cases are taking place not only in Azneft. There are quite a few small-scale oil recovery shops in the sector.

A major effort needs to be carried out to consolidate the enterprises, shops and brigades, and to find the best solution so that a brigade can service from 150 to 300 wells, a field can service up to 1,000 wells and an NGDU [oil and gas production department] can service up to 4-5,000. There should accordingly be some orientation towards consolidating enterprises and organizations involved in other activities as well.

To expand the rights and increase the responsibility of enterprise directors, for making effective use of their full complement of administrative staff employees, the ceiling on the number of these employees will be, as of 1 Jan 1987, abolished, and instead, a normative planning of the administrative staff's wage fund, on a percentage basis of the total wage fund of all employees will be put into effect. In so doing, norms are being established which will be progressively reduced throughout the course of the five-year plan period, and these norms will not be subject to change.

Within the limits of the norm-structured wage fund for administrative staff employees, the questions of the number of administrative personnel and their average wage rate will find independent solutions. This will put an end to all the requests for an additional allocation of these ceilings for setting up new enterprises and their subdivisions, with no real increase in their number of jobs.

One direction for improving the sector's effectiveness is that of improving the ways fixed capital and production capacities are put to use.

The valuation of fixed capital for all the directions in which Minnefteprom activities are carried out increases constantly, though this potential is however not put to satisfactory use, which is one of the principle reasons that the sector's return on its investment is falling off.

This is primarily associated with the use of the stock of drilled wells. In the 1st quarter of 1986, the wells were shut down for various reasons for 9.7 percent of the calendar working time. This exceeds the prescribed norms 1.5-fold.

The situation was particularly alarming in the Tyumen Oblast fields, where 17.8 percent of the oil wells were shut down during the 1st quarter, which is 2.3-fold higher than the norm. The Komineft, Embaneft, Mangyshlakneft, and a number of other associations, are suffering from serious shortcomings.

The gas and injection wells are being used in extremely unsatisfactory fashion. At the beginning of the 2nd quarter, some 16 percent of the gas wells and 23.3 percent of the injection wells throughout the sector were not operating.

It might also be well to point out that many wells are operating with reduced yields as a result of defects in the way their PPD [formation pressure-maintaining] systems are used, and because incorrect choices have been made with regard to equipment and operating schedules.

Effective measures are presently being used to improve the manner in which the well stock is used and here, along with those who work in the technical and engineering services, the economists and workers are expected to carry out a great deal of different kinds of work. Specifically, they are to ensure the balanced development of the capacities of all those subdivisions involved in servicing and repairing wells, and also are to introduce the advanced experience of the Arlanneft NGDU [Oil and Gas Production Department] everywhere, in order to motivate the repair brigades to curtail well shut-downs.

About half of the sector's fixed industrial production capital is allocated for oil wells, and the remainder comprises the various buildings, structures, equipment, transport equipment and other forms of fixed capital. Their cost, calculated per oil well for the years of the 11th Five-Year Plan period increased 1.4-fold, which indicates that there are definite surpluses (above-norm stocks of equipment and production areas, as well as underloading of developed capacities). With the sector's having changed over to self-repayment and self-financing, this practice could engender a serious situation, and it is for this reason that association directors and economic services employees should commit themselves to a radical reexamination of their attitudes towards questions of generating fixed capital. Construction of facilities should be undertaken and new equipment acquired only when the production program cannot be implemented with existing fixed capital. And in this connection, instead of new construction, reconstruction and technical re-equipping should be practiced more extensively.

An examination of the list of construction projects in the sector for the 12th Five-Year Plan period indicates that in far from all the areas have they approached the making up of applications for construction of new facilities responsibly. It has been decided, with the help of the associations' general directors, to reduce the number of construction project starts, and to put a temporary halt to, or reduce the estimated cost of projects which are now under construction.

Thus, the suggestions that several new sectorial machine-building plants be constructed were turned down, since the production capacities of the Glavneftemashremont [Main Administration for Petroleum Industry Machinery Repair] plants are only utilized at 70-75 percent, and the average operational shift index of the equipment comes to 1.25.

For example, there was a two-year period at the Syzran plant when 6,300 m<sup>2</sup> of available production area went unused. But in spite of this, a proposal was introduced that the plant be expanded and moved to a new territory. Because of a poorly thought out attitude vis-a-vis their equipment selection and list of manufactured products, the capacities they brought in have yet to be started up.

Directors of scientific research and planning institutes have not restructured their work, and they often insert, as part of their plans, obsolete equipment and production methods having poor technical and economic indicators. The economists must be painstaking in their monitoring of the effectiveness of all planning decisions, and must not allow any plans to be approved which do not match present production levels. There exist a number of examples of this way of working within the sector.

Thus, R50 million were spent to build some 1 billion m<sup>3</sup> during the construction of gas refineries in Western Siberia during the 10th and 11th Five-Year Plan periods. By using more progressive production methods and equipment in our designs, we plan to reduce specific capital outlays down to R34 million during the 12th Five-Year Plan period, which amounts to 32 percent, and which will reduce the fixed capital value and boost the yield on the capital.

If every general director, along with his deputy for economizing, were to examine in great detail his construction program once more from the standpoint of fulfilling the production plan, economizing on capital investments, boosting the yield on capital and reducing the prime cost, then they would doubtless find additional possibilities for reducing the list of construction projects as well as the volume of capital outlays.

The economists ought to focus their attention on the advisability and effectiveness of capital construction, and first and foremost on building up the active portion of the fixed capital. A goal-oriented policy such as this, as it relates to capital construction, will greatly improve the dynamic of the capital-output ratio, which is particularly important to the petroleum industry in connection with the reduction in oil and gas recovery levels in developed fields, and when the capacity of the production facilities which are rated at the maximum recovery level turn out, in time, to be working to full capacity. Our economists, working in conjunction with NII's [Scientific Research Institutes] must develop an efficient system for designing, building and renovating this sector's facilities so that they will be capable of more fully using their productive capacities and deriving the maximum economic effect throughout the entire period of a field's development.

Specifically, we need, in the gas refineries which are located in the older oil recovery regions where the level of capacity utilization during the 12th Five-Year Plan will possibly drop as much as 20-30 percent, to take measures to keep them working at capacity by bringing in natural gas from the main gas pipelines for refining. In addition, provision should be made for the renovation of a number of installations in order to initiate production of rust inhibitors and other low-tonnage chemical products.

As one of the measures which would bring about improvements in the utilization of fixed capital, all of the sector's associations need, at existing production areas, to organize efforts to increase the production of consumer goods and to render paid services to the population. This would also serve as a definite factor in carrying out the social program which was adopted by the 27th CPSU Congress.

We should dwell as well on the questions of the renovation of basic funds, as the Congress placed a great deal of emphasis on this subject. On the average for the sector during the 11th Five-Year Plan period, there was a 1.1 percent withdrawal of the industry's basic funds. Here, the amortization for their complete restoration, in accordance with established service deadlines, comes to an extra 5.6 percent, i.e., 5-fold higher. As a result, the sector's fixed assets are aging intensively, and their operation is accompanied with increased outlays of labor and materials for maintenance and repair. In the older oil recovery areas, assets are being spent to keep fixed assets in working order, which assets exceed the outlays for constructing new field facilities.

At the same time, the sector's enterprises are making far from adequate efforts with regard to technical re-equipping and renovation which, if done in adequate volumes, could put the brakes on unjustified increases in outlays for capital repair of these fixed assets. What is needed here is a persistent and purposeful effort on the part of the economists, to find and recommend the most expedient and economic solution in every specific case.

An effort is being made in the sector at the present time to take stock of its machines, equipment and production processes, and their technical condition is being determined as is the degree to which they stack up to the world level. The results of this effort will become the foundation of the program for the technical re-equipping and renovation, now being developed for the petroleum industry for 1986-1990 and up to the year 2000.

One of the urgent tasks facing the sector's economic services is that of increasing the amount of attention paid to the organizing of effective activities for the subsidiary-auxiliary and maintenance subdivisions and enterprises where, as has already been noted, most of the sector's employees are concentrated. At the same time, we are not giving enough attention to questions related to the economics of auxiliary production: there has been no system of planning indicators and economic stimulation worked out which fits in with the results of the work done by the maintenance subdivisions associated with basic production, there has been no universal organization of efforts to utilize our resources economically and effectively, or for giving our productive capacities a full work-load.

Thus we have at our disposal a considerable base for the repair and production of equipment. According to Minnefteprom, the volume of machine-building output in 1986 will exceed R360 million. Of this amount, some R100 million was used in the storage facilities and shops of the oil-producing associations. However, existing capacities are being put to extremely unsatisfactory use. So it is that the capacities of the Leninogorsk Automation Equipment Plant is operating under only a 40 percent workload, the Bashneftemashremont [Bashkir Petroleum

Industry Machinery Repair] Association's press and forge shop is working at 54 percent capacity, the Otradnoye and Saratov RMZ's [machinery and repair plant] are working at 60-70 percent capacity, and so on. The workload of a great number of the associations' repair centers is neither coordinated nor regulated, and they fail to take advantage of the benefits of specialization and joint work on single projects. Each of them produces the entire necessary array of products which are, for the most part, duplicated in other areas and are, as a rule, produced in small lots and are of poor quality on non-specialized equipment, all of which is carried out at a single shift's workload because of low work volumes. And all the while, there is a constant stream of proposals from these locales to include more new plants and depots in the construction plans.

More and more negative criticism is being heard from the foremen of drilling brigades and oil production and well repair brigade foremen with regard to shortages of tools and spare parts. In this connection, our associations have about 20 small-scale tool-producing sections working at a 15-20 percent workload, but not a single specialized shop which would be capable of meeting the demand of several regions at once.

The sector's established system of equipment manufacture and repair has become outdated. It is imperative that Glavneftemashremont set a direct course for inter-association specialization and cooperation.

An important direction for improving the effectiveness of the sector's production is to improve the operation of its specialized transport. In a number of oil-producing areas one out of three workers is involved in transport. With every year, the number of motor vehicles, tractors and special equipment which is put into service declines. In 1985 the percentage of motor vehicles put on line amounted to 53.8 percent, with that of dumptrucks at 40 percent. In the Permneft and Udmurtneft associations, less than 50 percent of the transport equipment is put into service, and only 37 and 38 percent respectively, in the Embaneft and Aktyubinskneft associations.

Every year, tens of thousands of vehicles stand idle in technically inoperable condition, even though the number of maintenance personnel calculated per single transport unit, and only for Western Siberia, increased in 1985 2-fold, in comparison with 1975. A vast army of repair workers has been scattered among the numerous poorly-mechanized shops and sections, which are ill-equipped for repair work. In addition, up to 50 or 60,000 drivers and specialists take part in repairing their equipment. At the same time, an average of some 9,800 motor vehicles, tractors, road-building equipment units and special-purpose equipment units have been standing idle because of a shortage of drivers.

All this attests to the fact that the sector is in need of a radical restructuring of the mechanism by which production-related transport is administered. The primary direction for this restructuring could be the concentration of equipment in base UTT's [Technological Transport Administrations] which have affiliates and columns in the fields, and the setting up of central district transport maintenance points. Transport Administration workers, together with the production associations, need to accelerate the working out of this problem.

In terms of improving the efficiency of the work done by the sector's auxiliary and maintenance enterprises, we need also to remember that the subsidiary agricultural economies showed losses of R18.6 million in 1985. Economic services employees of the associations and enterprises must constantly monitor the activities of these economies and ensure that they operate at a profit.

One of the generalizing indicators of the work done by the production collectives is the dynamic of the prime production cost, in which are reflected the results of their efforts to increase labor productivity and to improve the uses to which fixed assets, material-technical and financial resources are put. How are we doing with regard to this generalizing economic indicator?

The outlays borne by the sector are constantly increasing. Certain associations have allowed planned prime costs to be exceeded, and this was brought about not only by their not fulfilling the plan for oil recovery, but also because of serious flaws in the production economic activity of said associations. Thus, associations which have failed to fulfill the plan for oil recovery and output sales only in accordance with the "other monetary outlays" sub-head, which is unaffected by the volume of oil recovery, have allowed an absolute overexpenditure in an amount exceeding R70 million.

The sector is faced with serious problems related to reducing its outlays during the 12th Five-Year Plan period. And we will be estimating the level of work done by directors of associations and enterprises, as well as their economic services by the way in which they manage, during the current five-year plan period, to meet the established ceilings on outlays and profits. It needs to be borne in mind that the ceilings on the prime cost for this five-year plan period need to be perceived as the maximum allowable. And the efforts to reduce the prime cost must be structured accordingly. To do this, the yield on capital has to be increased, as does labor productivity, the work done by the auxiliary and maintenance productions has to be improved, and material outlays have to be reduced.

The sector's enterprises have recently been making a determined effort to improve the manner in which material resources are used and stored, and a system of economic incentives has been introduced. However the situation still cannot be called satisfactory. Certain places have allowed careless storage practices to cause deterioration and spoilage of pipe, cement, chemical reagents and other materials. As this occurs, these losses are often written off as costs, and this provides the basis for mismanagement, which has been justifiably pointed out by the supervisory agencies.

The associations' storehouses and depots contain the huge above-plan stocks of materials and equipment, of which a total of R249 million was counted on 1 Jan 1986. As a result of the fact that the accounts and information regarding the available material resources is not kept up to date, there frequently occurs a situation in which one location would be experiencing an acute shortage of resources, with a surplus of existing resources at another location. The potentialities of up-to-date computers and the computer centers which have been set up in the association, both of which would help to distribute these resources efficiently, have not been put to use. These efforts are being carried

out slowly and disconnectedly. The administration needs to take these efforts into its own hands and sharply raise the level of coordination regarding the work to set up automated control systems within the sector.

Certain associations are tolerating disgraceful cases of mismanagement, where poorly-skilled executives, in the absence of appropriate supervision from their directors apply for and obtain unneeded materials and equipment, which makes the association's financial situation worse. In 1985 alone, a total of R1 million in superfluous equipment was ordered and received. In order to put a stop to similar cases, we need to implement jointly an effective system of profit and loss cost accounting from top to bottom: from brigade cost accounting to those associations which finance themselves, and throughout the sector as a whole. When the enterprises and associations pay, so to speak, out of their own pockets for the material resources which they have allowed to become ruined, and for the superfluous and unneeded stocks, then will the attitude towards these questions undergo a radical change.

The experience gained by the leading Tatneft, Bashneft, Kuybyshevneft and other associations is a persuasive indication of what sort of copious reserves exist as a result of the extensive introduction of low-level cost accounting in the brigades and shops. However, this experience has not been applied in a number of areas. Thus, a check which was made in the Nizhnevartovskneft NGDU [Petroleum and Gas Production Administration] showed that low-level cost accounting was implemented only formally and has had no practical effect on the results of the work done there.

The effort being made in the sector to set up cost accounting brigades is going poorly. At present, only 17 percent of all the workers in Minnefteprom are employed in these brigades, and this includes 3-6 percent in the Embaneft, Aktyubinskneft, Azneft and Krasnodarneftegaz associations. The proportion of all those working in the Glavtyumenneftegaz Association who work in cost accounting brigades comes to 12 percent, with the figure for Tomskneft set at 16 percent. This level is too low in the majority of the remaining associations as well. And the fact is, that all it takes for this practice to be universally implemented is the organizational efforts of the economists.

It is the science of this sector in general and the science of economics in particular which play a particularly crucial role in the determination of methods and the developing of measures which will improve the effectiveness of the petroleum industry.

We recall quite well how severe, albeit deserved and justified was the criticism to which our sectorial science was subjected during the 27th Party Congress.

Thus, of 1,075 efforts completed in 1985 by our sectorial institutes, on 34, that is 3 percent, were on a par with those achieved by other countries of the world. The volume of theoretical and exploratory work has fallen off sharply, and this has had a negative effect on the status of the sector's scientific backlog. Scientific research efforts have not been concentrated on the sector's most crucial problems, but have been scattershot in trivial and little important directions. A great deal of monies have been paid out to a variety of

scientific research organizations in accordance with agreements. Everyone concludes these agreements, but there is no effective demand on the part of anyone for a scientific or practical yield on the sums paid out in accordance with them. The effect derived from the new equipment and production methods is frequently derived only on paper, in the computations drawn up and signed by the economists, which put economically unjustified developments into the world and which make possible the awarding of undeserved bonuses. We are going to put a definite stop to these acts, considering them, as we do, to be misappropriations of socialist property with all the consequences which that entails.

Our economic science owes a great deal to production as well. Not to belittle the great efforts made by our sectorial economic scientists in determining the prospects for development in the petroleum industry and in improving the system of methods used in its planning, which also include using the achievements of scientific and technical progress, it has to admitted frankly that their are more deficiencies in its work than achievements.

Thus, our science has not acted promptly in working out the methodological questions related to further improvements of the sector's economic mechanism, and we are left unclear with regard to many other questions. A poor job is being made of efforts to conduct an economic analysis of the work of the sector's associations and enterprises and the work on economic measures aimed at improving production efficiency. Completed developments do not always make it to the stage of practical realization. For example, such was the case with the extremely important methods for the economic evaluation of the oil fields, which was based on long-run marginal costs [zamykayushchiye zatraty], and which had to evaluate them from positions of their national economic effectiveness. This system of methods was perfunctorily developed, approved and put into effect, however, because of a number of underdeveloped facets, it is not always used correctly, and in general it is not used at all.

The economists from our sectorial institutes, and particularly the VNIIOENG [All-Union Scientific-Research Institute of the Organization, Administration and Economics of the Petroleum and Gas Industry] management must bring about radical improvements in the level of scientific and economic research and methodological efforts, and must concentrate these efforts in the most critical directions for developing the sector's economy during the 12th Five-Year Plan period and thereafter.

Among such immediate problems, we should put the improvement of the sectorial economic mechanism, the organizational structure of administration, and the continued development of a methodology for sectorial planning, based both on stable economic normatives and on in-depth economic analysis.

The plan for economic and social development during the 12th Five-Year Plan period has been formulated, approved and brought to each association. The associations' economic services employees need, based on their in-depth analysis of the problems associated with developing their own areas, to develop and confirm intense, but real and balanced five-year plans for all subordinate enterprises and organizations. This will have to serve as the first stride in realizing those major and responsible tasks with which the oil industry is faced.



This must be followed by a vital practical effort to organize the fulfillment of the plans which have been adopted through the use of the total mobilization of all our internal resources, and through the economic and effective utilization of the resources allocated to us.

We will not be judging the effectiveness of the work done by the economic services by the number of measures and accounts they compile, but by the actual improvement in the economic indicators of the activity of the subordinate enterprises.

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## ELECTRIC POWER GENERATION

### KIEV POWER SYSTEM TO BE UPGRADED

Moscow ENERGETIK in Russian No 10, Oct 86 pp 1-2

[Article by L. N. Sosyukin, General Director of the PEO of Kievenergo: "Introduction of the Achievements of Scientific and Technical Progress at PEO Kievenergo Enterprises"]

[Text] In light of the 27th CPSU Congress's decisions on problems of accelerating scientific and technical progress and the wide introduction of new equipment and basically new technologies, PEO [Power-Production Association] of Kievenergo [Kiev Regional Administration for Power Systems Management] has developed a plan for introducing scientific and technical achievements during 1986-1990. It pays much attention to developing the power-engineering base.

It requires that 428 million rubles of capital investment, including 321 million for construction and installing work, be assimilated during the 12th Five-Year Plan: these amounts are, respectively, 120 and 148 percent of the amounts for the 11th Five-Year Plan. Substantial growth in the amount of construction and installing work is stimulated by progress in construction of the Kanevskaya GAES [pumped-storage electric-power station], which is called for by the "Main Directions for the Economic and Social Development of the USSR in 1986-1990 and During the Period up to the Year 2000," and it is to provide for further improvement in the power-capacity structure by creating load-shifting electric-power stations.

Great importance is also attributed to a further centralization of heat supply. For this purpose, a rise in the heat capacity of Kiev TETs-5 and TETs-6 by the installation of 3 hot-water boilers of 180 gigacalories/hr each at each electric-power station is called for; and the heating grid's length is to be increased by 48 km.

The forming of the country's Unified Power System will continue during the 12th Five-Year Plan. PEO Kievenergo forces will build a section of a 750-kV intersystem power line, and also three VL's [overhead power lines] of 330 kV. Moreover, two 330-kV substations will be built and put into operation.

The work that began during the 11th Five-Year Plan on the withdrawal from operation and the dismantling of obsolete equipment at TETs-3, the Darnitskaya TETs and rayon boilerhouses will continue, and also during the 12th Five-Year Plan it is planned to withdraw from operation two 25,000-kW

turbines, and to dismantle obsolete boilers. At the same time, Kievskaya TETs-6, which is supplied with the most modern equipment, will be put into operation.

Reequipping work is to be done in the power system. The Darnitskaya and Cherkasskaya TETs's are among those to be modernized. During the rebuilding of these facilities, the TsVD's [high-pressure cylinders] on three turbines with a total capacity of 160 MW (sets Nos 1 and 2 of the Chernigovskaya TETs and set No 5 of the Darnitskaya TETs) will be replaced. Moreover, it is planned to rebuild the Kiev GAES by installing three modernized reversible units of higher capacity and more economical operation, and also to develop a design for rebuilding the Kievskaya and Kanevskaya GES's into GAES's, in order to improve smoothing of the daily load curve through flexible generating capacity.

It is planned to spend 36 million rubles of capital investment, 22 million of it for construction and installing work, on reequipping and rebuilding.

Special attention is being paid in all the multiple-faceted aspects of accelerating scientific and technical progress to reducing the consumption of material, labor and financial resources.

In order to save more fuel, some steps will be taken to make the electric-power station system more economical. In order to make more complete use of TETs equipment and to increase the generation of electricity for the district-heating cycle, it is planned to transfer the load of the TETs-2 trunk lines to Kievskaya TETs-6 and to transfer the heat load of the TETs-3 region to Kievskaya TETs-5. This will enable TETs-2 and TETs-3 to be shut down completely during the summer.

In order to reduce specific fuel consumption at the Chernigovskaya TETs, a TG-3 turbogenerator will be converted to heating-schedule operation at Kievskaya TETs-5 and the Tripolskaya GRES, work will start on the introduction of ball cleaning of condenser tubes, and at Kievskaya TETs-6 work will start on mastering unit operations that are based upon sliding parameters and the burning of mazut with a minimum of excess air.

A number of operations have been planned for reducing operational consumption of electricity while it is being transported and distributed. These include conversion of the grid to a higher voltage (25 km of grid will be converted from 6 to 10 kV), optimization of the operating modes for the automatic operation of static condenser batteries (BSK's) and the further development of energized operations. The economic benefit from introducing these measures will be 400 million kWh.

Measures taken to save fuel cannot help but effect an improvement of the ecological situation. PEO Kievenergo, jointly with the Ukrainian Section of VNIPInergoprom and the Kiev City Executive Committee of People's Deputies, has planned to develop and implement a special program for closing small boilerhouses and centralizing the heat supply for Kiev city customers through PEO Kievenergo heating grids. From this alone, 15,000 tons of standard fuel equivalent should be saved, or more than 70,000 tons in all during the 12th Five-Year Plan.

Along with observance of the savings program, great importance is attributed to increasing labor productivity at energy-system enterprises. For the development of integrated scientific and technical programs during the 12th Five-Year Plan, there is to be a further reduction in the use of manual labor through integrated mechanization and automation. For this purpose, integrated brigades will be created to repair heating grids, specifications for overhauling power units will be introduced, new technology for making repairs will be used, and machine tools and accessories developed jointly with scientific-research institutes will be introduced.

It is planned to create within the power system during the 12th Five-Year Plan a regional branch system for simulators (and introduction of three study and training centers), the execution of a number of operations on equipment diagnostics, using microprocessor equipment, and the introduction of an industrial-process computer. From this will come the introduction of automated systems for controlling electrical consumption and modernization of schemes for monitoring and controlling power units, the placement of Tripolskaya GRES sets Nos 5 and 6 on a new element base, the transfer of protection to the computer, automation of the planning of technical and economic indicators, including the price of fuel and amortization, and reequipping of the information system of power facilities controlled by TsDP's [central control stations]. It is planned also to create 10 automated workplaces that are based upon personal computers.

The necessity for increasing the effectiveness of measures for conserving the environment and for making rational use of resources has now led to enterprises reducing their discharges of untreated water into the Black Sea basin. It should be noted that there are still unresolved problems about protecting the air basin. For this purpose it is proposed to convert the Darnitskaya TETs to the burning of gas, excluding it from the solid-fuel market. Moreover, a number of measures will be adopted for monitoring and reducing discharges of harmful substances into the atmosphere. These include all fuel-saving measures and also the introduction of modern methods for suppressing nitrogen oxides and of instruments for determining the content thereof in stack gases.

At Kievskaya TETs-6 a technology for isolating compounds in the wash water of the RVP [repair and restoration unit] for further use in the metallurgical industry will be introduced, following Kievskaya TETs-5's example. At the Tripolskaya GRES it is proposed to introduce separate ash and slag removal, in order to utilize ash and slag waste; doing so will enable waste utilization to be increased to 30 percent annually.

In order to carry out successfully the contemplated plans and tasks of the 12th Five-Year Plan, the power system's party, trade-union and Komsomol organizations, jointly with organization administrations, will mobilize all reserves, primarily the human factor, in order to energize personal motivation toward the work performed, a creative approach, initiative and enterprisingness and to increase creativity and a sense of responsibility for the assigned task.

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## ELECTRIC POWER GENERATION

### ROLE OF POWER PLANT INSPECTORS TO BE RAISED

Moscow ENERGETIK in Russian No 10, Oct 86 pp 37-38

[Article by Engineer A. N. Sergeyev: "Raise the Role of Engineer-Inspectors in Order to Ensure Reliable and Accidentfree Operation of Power Enterprises"]

[Text] An All-Union conference, "The Role of Engineer-Inspectors of the Reliability and Safety-Engineering Services and of USSR Minenergo Inspectors in Eliminating Deficiencies That Prevent the Stable and Economical Operation of Power Facilities," convened in June 1986 at VDNKh SSSR [USSR Exhibition of Achievements of the National Economy].

Representatives of the reliability and safety-engineering services of all power systems, engineer-inspectors of large power stations and power-grid enterprises, workers of Gosinspektsiya [State Inspectorate] for the Operation of Electric-Power Stations and Power Grids, and specialists of design, setting-up organizations and central-controller administrations took part in the conference's work.

First Deputy USSR Minister of Power and Electrification A. N. Makukhin noted in his opening address that in the fall-and-winter period 1985/1986, thanks to the organizational and technical measures taken, but mainly through USSR Minenergo's use of new planning methods and economic incentives in the second half of last year, the power system's power facilities worked stably. By the end of 1985, 10 million additional kW of capacity had been brought into operation. The industry's accident rate did not increase despite the fact that the power generated during the 11th Five-Year Plan increased by almost 20 percent.

Many power-line enterprises have been working for long periods without accidents. In recent years the share of accidents caused by personnel error has been reduced, and the Tripolskaya, Kostromskaya, Litovskaya, Lukomlskaya and Sredneuralskaya GRES's and a number of other power stations operated without accidents that resulted from this cause during the five-year plan.

However, the work being done to increase the reliability of power generation and to reduce the incidence of accidents gives no basis for self-satisfaction, since the overall accident rate still is high. The fact that planned measures are not being carried out completely and on time prevent a substantial reduction of it.

Managers of enterprises, power systems and specialized services and organizations do not always detect, evaluate and anticipate trends toward reductions in equipment reliability and increases in the accident rate. Not all workers of the reliability and safety-engineering services and enterprise engineer-inspectors have restructured their work yet with a view to intensifying accident prevention.

The report of K. S. Storozhuk, chief of the State Inspectorate for the Operation of Electric-Power Stations and Power Grids, presented a detailed analysis of accident frequency in power systems and at enterprises, and causes of the incidence of accidents were disclosed.

Attention was given to the fact that a large number of power-station and power-grid equipment failures were caused by unsatisfactory repair; by nonexecution during repair of important accident-prevention measures and of checklist operations; by important deviations from the requirements for accepting equipment from repair and assessing its quality; and by managers' underevaluation of the importance and the need for performing intermediate and current maintenance.

It was emphasized that causes of the high accident rate because of personnel error include poor vocational training, deficiencies of training combines and training centers, and a weak training base.

The report identified the main directions for accident-prevention work: careful investigation and authenticity of the reporting of all violations; organization of unconditional implementation of the measures for raising reliability called for by the guiding documents; maintenance of high mobilizational readiness of personnel, especially their responsiveness; constant rise in the knowledge and state of training of personnel, and indoctrination of personnel in a feeling of responsibility for the job assigned; a rise in personal responsibility of all supervisors for accidents and violations and for nonimplementation of accident-prevention measures, regulations and other instructions on matters of reliability and safety engineering; and restructuring of the work by workers of the power-system reliability services and by enterprise engineer-inspectors, with a concentration of efforts on supervision over the observance of the norms and rules for equipment operation, the maintenance of the operating discipline of tending personnel, organization of the monitoring of accident-prevention work at all levels of power-generation management and the active use of measures for administrative and pecuniary influence on supervisors and workers who do not support the required level of accident-prevention work.

R. A. Gadzhiyev, chief of USSR Minenergo's Administration for Safety Equipment and Industrial Sanitation, pointed out the role of the reliability and safety-engineering services in reducing injuries and noted that power-enterprise supervisors do not always evaluate their work self-critically, have become habituated to deficiencies, and consider mishaps to be somehow inevitable. An analysis of production-type injuries indicates that their root causes are organizational omissions: low levels of knowledge and of labor and production discipline of personnel; violation of the work-order system and inadequate monitoring of production work, and so on, as well as equipment deficiencies: malfunction of the equipment, low quality thereof,

and so on. The power systems' reliability and safety-engineering services still do not come out everywhere as organizers of the safe performance of operations; they must restructure their work: raise exactingness toward work-safety violators; pay more attention to questions of increasing knowledge of the rules and norms for work safety; and find and eliminate violations more energetically and extend practical assistance toward their elimination. It was emphasized that what is necessary is not a gradual reduction of injuries but urgent eradication thereof, and for this purpose a decisive struggle should be waged for a strengthening of discipline, proper organization and orderliness, and the attitude toward safety engineering should change radically.

A. D. Shcherbakov, chief engineer of the State Inspectorate for the Operation of Electric-Power Stations and Power Grids, after noting that the level of training of operational, current-repair and repair-and-setting-up personnel lags behind the increase in the requirements being presented, emphasized the necessity for monitoring steadily the training of personnel at all levels of management through the regional systems that have been established; improving the training process, increasing the proportion of training time spent on performing vocational exercises; expanding the network of special-purpose courses for the all-round training of repair and setting-up workers; eliminating every arbitrariness in checks on the knowledge of personnel, the conduct of training and development of habits for controlling the equipment; speeding up the introduction of technical training aids for individual and collective use, and developing training programs that would start from an analysis of all violations in the branch and would end with a compilation of the scenarios, program aids, "situation-evaluation trees," and other documents for specific types of training aids; and improving methods for the vocational selection of workers and the system of incentives for accident-free work. Personal example and the motivation of the managers at all control levels toward the organization of training bases, the monitoring of the completeness and quality of existing forms of work with personnel, and the analysis of deficiencies and violations during production work and the tie-in thereof with plans for training personnel, with use of the branch's technical standards and organizational directives, are very important.

The speech of I. I. Levchenko, chief of the Caucasus regional organ of the State Inspectorate for Operations noted the growing influence of the human factor in the production process and the necessity for tying it in with personnel training. Since a large portion of the workers who have been pouring into the collectives of enterprises of the North Caucasus and Transcaucasia, where there is a shortage of worker personnel, are basically young people who have arrived after service in the army and who finished school prior to that, they are included right off in the production process and learn from their own mistakes (so-called violations "caused by personnel error"). In this connection, special attention must be paid not to the existence and the number of instructions and the amount of training and instruction performed but to the quality of this work and to the training of young workers on simulators. There has now arisen a demand for deep analysis of the workload of operating personnel, since this aspect is not being properly monitored. Because of the great workload, various categories of personnel are not in a position to issue timely and precise instructions and to receive information in timely fashion. A sequence for making decisions, which frequently turn out to be erroneous, is being established.

The director of the methods office of USSR Minenergo's Administration for Worker Personnel, L. S. Zhukov, noted that at the industry's enterprises the predominant view concerning the training and retraining of worker personnel remains that of teaching them directly on the job. This is because of the poor development of the training-operations base of power enterprises and the lack of experienced instructors and production-training experts. Pedagogical cadre comprised of supervisors, engineers, technicians, specialists and skilled workers do not possess the required knowledge in the field of pedagogy, psychology and vocational-training methods, and this circumstance affects teaching practice adversely. Generalization and transmission of positive experience in training and in raising worker qualifications on the job are required. Where the USSR Minenergo system develops a material base, teaching and training centers, training grounds and training combines must be furnished, and serious attention must be given to those who will operate these facilities and who will train on them.

A. S. Cheremin, chief of the Reliability and Safety-Engineering Services of the REU [regional power-production administration] of Krasnoyarskenergo [Krasnoyarsk Regional Administration for Power Systems Management] told about the status of accident-prevention work in the services and enterprises of his administration. The power system has developed and introduced a system of organization for fulfilling directives from Glavtekhupravleniye [Main Administration for Power-Systems Operation] (circulars and decisions).

V. F. Senchurin, chief of the Reliability and Safety-Engineering Services of Sverdlovenergo [Sverdlovsk Regional Administration for Power-Systems Management] told about experience in introducing a standard for organizing accident-prevention work in the power system.

I. Ye. Krasnov, senior engineer-inspector for operations of TETs-26 of Mosenergo [Moscow Regional Administration for Power-Systems Management] reported that one of the main areas of activity of an engineer-inspector for operations is preventive work: the discovery of bottlenecks, deviations and violations of the PTE's [equipment-operating instructions], participation in commissions that check the knowledge of personnel and, as a monitoring official, in accident-prevention exercises, and adoption of measures (within their competence) on the implementation of plans for accident-prevention work. In executing monitoring functions, the engineer-inspector also becomes a helper to the chief of the department and of the shift in the execution of measures taken in accordance with accident-prevention documents.

L. S. Tobin, chief of a section of the State Inspector for the Operation of Electric-Power Stations and Power Grids, described typical deficiencies in determining the causes and the parties guilty of violations at work. He noted that discovery of the true causes and of the parties guilty for breakdowns will enable the necessary and correct technical and organizational measures for preventing violations to be developed and carried out.

Chief Engineer of the REU of Mosenergo V. V. Kudryavyy told about certain peculiarities in the work of reducing accidents in the Moscow Power System. The most important area for increasing reliability is the reequipping of enterprises and the mandatory execution of accident-prevention measures, whose necessity has been proved by operating experience. A no less important



task is the replacement of various types of equipment whose reliability characteristics either are reduced because of lengthy operating service or do not correspond to the new operating environment. These areas are under the constant monitoring of the reliability services, which are actively associated with the analysis of damaged equipment and which quickly notify enterprises about contemplated measures for preventing violations and follow up on their execution. The monitoring of fire safety is vested in the service, and, in this case, aside from its monitoring functions, it directly distributes resources for fire-extinguishing and other equipment, and the service's workers take part in joint training exercises for personnel of the power stations and grids that have fire units. A combining of inspection work in finding deficiencies with creative, exploratory organizer's work yields good results.

The conference's decisions proposed: to strengthen decisively the material and disciplinary responsibility of supervisors and engineer-inspectors of power enterprises and of production-services workers for accidents that occur because of disturbances in operation that have not been eliminated in good time; to raise sharply the level of preventive work and of monitoring of the unconditional fulfillment of accident prevention circulars, directives, instructions and other standard documents that are aimed at providing for reliable, safe and economical operation of equipment, buildings and structures; and to raise sharply the level of work with personnel.

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CIVIL AVIATION

ANTONOV BUREAU OFFICIAL ON An-124, An-74 AIRSHOW APPEARANCES

Moscow VOZDUSHNYY TRANSPORT in Russian 20 Sep 86 p 4

[Interview with A. Bulanenko, deputy general designer in the Design Bureau imeni O. K. Antonov, by V. Karpiy, VOZDUSHNYY TRANSPORT correspondent; date and place not specified]

[Text] As our newspaper has written, the An-124 airplane -- the Ruslan -- which is the largest transport airplane in the world, participated in two international exhibitions of aviation equipment this year: In Farnborough and Vancouver.

Our correspondent met with A. Bulanenko, the deputy general designer at the Design Bureau imeni O. K. Antonov, who was in the Soviet delegation that was invited to Vancouver.

[Question] Anatoliy Grigoryevich, we have already informed our readers about the impression that the Ruslan made in Farnborough. Who organized the exhibition in Vancouver? What were its distinctive features?

[Answer] The Abbotsford Air Show in the city of Vancouver in the Canadian province of British Columbia -- this is a traditional annual review of the world's aviation equipment. This show was a jubilee one -- the 25th. Our country was represented at Abbotsford for the first time. This air show is a distinctive branch of the Expo-86 international exhibition whose slogan is "The World in Movement". The exhibit itself is an extremely brilliant and motley picture. It is sufficient to say that countries, such as the USSR, the United States, England and France, the Canadian provinces, individual states, and even firms have their own civilians at it. The exhibit is intended for a wide and varied circle of visitors, and that is why there are theaters, movies and attractions at it. However, at the same time, an extensive field of activity is offered here for specialists, especially those in the transportation field.

[Question] In your opinion, to what type of transport is the world giving preference, judging from the exhibitors and the exhibitions?

[Answer] To aviation. Motor vehicle, water and railroad follow next. The section in the Soviet pavilion, which tells about the work of Aeroflot and the participation of aviation in the country's national economy, is enjoying unflinching success. There are many visitors near the stand that is devoted to the flight of V. Chkalov's crew to the United States. The ANT-25 commander's helmet and flight suit, personal belongings of the participants in the flight, documents, and photographs are under glass. One should mention that our pavilion is the one most filled with exhibits, models and operating stands. This, of course, attracts visitors.

The Americans have taken a different path. Information is mainly depicted by them on stands and on video tape.

[Question] However, let us return to Abbotsford....

[Answer] This airport is located 70 kilometers from Vancouver. Two figures, which set records, testify to the popularity of the air show. The first one is 110,000 visitors a day. There has never been such an outpouring of viewers before.

[Question] Anatoliy Grigoryevich, the USSR was represented by two machines from your design bureau -- the An-74 and the An-124. Why was it decided to show these airplanes?

[Answer] There is probably no need to say a lot about the Ruslan. This airplane has evoked enormous interest in the world.

About the An-74. When we were flying to Vancouver, I caught myself thinking that Canada reminds me a great deal of our Siberia. Mounds, mountains, tundra .... In general, those conditions for which the An-74 was built. That is why it interested the Canadians so. On the second day after our arrival, the Canadian minister of science development visited us on board. He likes very much the high placement of the engines, the fact that large portions of the technical maintenance operations for the aircraft could be done directly inside the fuselage, and the equipment for long flights over terrain without reference points. The Canadians admitted that they had no similar airplane and, evidently, foresaw none in the near future. It will be necessary to use old military airplanes. This, of course, will have a noticeable effect on the rates with which the Canadian north is developed.

Polar aviation veterans, the pilots who spent the war years ferrying airplanes to Alaska, repeatedly examined the An-74. They had an excellent knowledge of the cost of any machine designed for operations under polar conditions. You do not expect empty compliments from them. That is why their appraisal of the An-74 as a successful airplane, which has prospects, was doubly pleasing to us. However, they only made use of that information which they received from us. They had not heard about the latest trip of the KOMSOMOLSKAYA PRAVDA expedition led by D. Shparo and the participation of the An-74 in it and its landings on ice....

[Question] Nevertheless, a few words about the Ruslan. You see, it has only taken part in three international exhibitions....

[Answer] Yes, the An-124 was shown last year for the first time at Le Bourget. At the time, many directors of foreign aviation firms regarded reports in the press about the Ruslan with extreme skepticism. Its demonstration flights in France quickly dispelled all doubts about the Ruslan's capabilities. The Abbotsford show, during which the airplane was shown abroad for the second time, confirmed the high class of the machine. That is why it is not surprising that the Ruslan evoked burning interest. A whole "landing party" of aviation specialists with the most varied specialties and from very different firms, landed in Vancouver. Moreover, our machines were really new items.

They waited for the Ruslan's landing. They waited with impatience. And that is why, when they received the report that it was on the approach, it became known in a moment to everyone who was at that hour in Abbotsford. The people stood along the runway in a solid wall. The An-124 passed over the runway, turned and landed. In 14 hours in the air, it had covered 12,500 kilometers without landing. This news evoked applause. The crew had managed to turn the aircraft literally on a dime; this also evoked quite a bit of delight.

However, problems arose further on. They allotted a place to the Ruslan, having lost sight of the power of its engines. That is why V. Terskiy, the airship commander, had to demonstrate fine skills in taxiing so as not to blow away or blow down the tents and pavilions which were encountered on the way. Nevertheless, he did not manage to get to the hardstand under his own power. We had not foreseen such a turn of events and ordered a tow. A tractor approached, but it was not able to move even an empty Ruslan from the spot. We turned for help to the military. The same results. A mining firm, who sent a very powerful prime mover, came to the aid of the show's organizers. Jumping ahead, I will say that before the Ruslan's return, it was necessary to tow it empty to the taxi way and only then load it with fuel. Otherwise, no prime mover could be found in Vancouver which was able to work with a refueled airplane.

In general, our Ruslan made a noise, particularly many observers gathered daily at the time when we demonstrated the operation of the nose cargo hatch. It was as if the aircraft was raising its "trunk" and squatting on its "front knees". This "dance of the elephants" evoked general delight. The other machines did not do this.

[Question] Were there other aircraft of this same class at the exhibition?

[Answer] Yes, in fact, all three world giants: Our An-124 and the American C-5B Galaxy and C-141B, were at Abbotsford. Last year, the Ruslan took the world cargo carrying records from the Galaxy. The C-141B is an aircraft in the Il-76 class, which has been equipped with a 7.5 meter-long module that has been inserted into the fuselage.

[Question] What lessons did you extract from this meeting?

[Answer] We liked the Galaxy's finishings in the cargo compartment and a number of other components that were interesting for specialists with respect to airplane interiors. In everything else, the Ruslan was either higher than or equal to the C-5B.

[Question] Are the Americans not intending to take the records from the Ruslan?

[Answer] We posed this question to many people including the president of the MacDonald-Douglas airplane building combine, who flew in only to see the An-124. No, they are not planning to. They are now performing work on other airplanes.

[Question] Nevertheless, if such an attempt is made ...?

[Answer] I think that the Ruslan will find a way to answer the challenge. We suggested a contest to the Americans in achieving records and not in an arms race. However, we did not receive a clear reply.

[Question] Not the worst goal of such shows is to amaze visitors. What surprised you?

[Answer] The absolute lack of knowledge on the part of the overwhelming majority of Canadians and Americans as regards the truth about the USSR and our way of life. A discussion with a team of physicians, who work at the airport in Thunder Bay where the An-74 made an intermediate landing, especially startled us. The doctors had no idea about the Soviet system of health care and that we provide free medical treatment. They did not believe this. Other information about our country was also extremely scanty and one-sided. Interest in the USSR, however, is enormous. Each morning we spread out in the cargo compartment of the Ruslan a set of brochures that told about the 27th CPSU Congress. They sold like hot cakes.

One of the most frequent questions was: "Is it true that the Ruslan is built from domestic materials and Soviet engines are mounted on it". The answer, which surprised everyone was: "To the last screw".

[Question] Judging by the success of the show, they love aviation in the world?

[Answer] Yes, we had quite a few meetings during which we were convinced of this. During the first trip by the An-74 that the crew of S. Gorbik pilots, we had occasion to answer numerous questions from journalists. We heard this interview the next day on the air. In Thunder Bay an aircraft, which an extremely elderly individual was piloting, landed right after us. It turned out that it was a former aviation technician who had met the crew of Chkalov. He greeted us like old friends.

However, the "flight into history" made the greatest impression on us. Airplanes of various types and from various times flew to Abbotsford and made a flight over Expo-86 in order to attract the public there. The oldest airplane was the 1927 Ford -- and it flies! Generally speaking, aviation museum affairs are well organized in Canada and yes, throughout the world.

The initiative of Aeroflot's leadership and your newspaper to establish a civil aviation museum and to search for old airplanes is a fine one. You see, besides the fact that quite a few unique designs are preserved in old airplanes, they are -- and this is the main thing! -- the people's memory of those who conquered the fifth ocean, their courage, valor and glory. Of course, two-three museums for such an aviation power, as ours, are very few. We, the Antonov workers have already undertaken a number of efforts in this direction on our part.

[Question] Thanks for the interview. A last question: Where will the Ruslan fly after the exhibition?

[Answer] To work. To Siberia and to the Far East.

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## CIVIL AVIATION

### An - 28'S IN NORTHERN REGIONS LACK SKIS, TRAINED CREWS

Moscow VOZDUSHNYY TRANSPORT in Russian 25 Sep 86 p 2

[Article A. Tarapun, secretary of the Syktyvkarskiy Aviation Enterprise party committee: "For Flight Security -- A Plane Needs Skis in the North"]

[Text] It is clear to everyone that the majestic tasks, which the party assigned at its 27th congress, can only be solved with the incorporation of the achievements of scientific and technical progress into life.

This year, we began to operate a new type of aircraft -- the An-28 airplane. To say that this is an important stage in the life of our collective is to say little. One must imagine our Komi republic with its enormous territory, forests, tundra, remote taiga settlements, and majestic construction projects. It is necessary to know what future awaits this very rich kray. Timber, coal, oil, gas -- along with these riches of our kray, recently discovered deposits of new ones, bauxite, titanium, oil shale, and other mineral raw materials are being developed.

However, if one adds to this a shortcoming which is natural for such a still sparsely settled kray as the absence of sufficient good roads, it is possible to understand the happiness which they experienced in the republic at the news that a new comfortable and reliable machine -- the An-28 airplane -- was arriving for local airlines.

We, the workers in the aviation enterprise, also experienced the same happiness.

Yes, how could one not be happy! Our enterprise had carried passengers on the republic's local airline for 50 years -- 15 of them in the Po-2, and the subsequent 35 in the An-2 airplane. However, this airplane now no longer satisfies either the demands of the passengers nor the requirements of the rapidly developing kray.

That is why we began test operations of the An-28 in 1985 with a great deal of enthusiasm.

After almost a year of test flights, the first 17 passengers were festively sent on the first trip to the rayon center of Ust-Kulom on 30 June 1986. Since that date, the An-28 has solidly taken its place on our airlines, having insured a high degree of regularity, reliability and comfort.

However, one cannot avoid paying attention to the problems that the appearance of this new equipment involved.

The first one is connected with the training of crews for this airplane. Whereas we managed to organize the training of the technical staff at the base of the training subunit of the Komi Administration of Civil Aviation, the crews were trained only in remote Dushanbe and the frequency of classes did not satisfy our needs. The number of airplanes is increasing, but there are clearly not enough crews for them.

The next problem was the training of technical and engineer personnel. The fact is that, in accordance with the "Directions for the Operation and Repair of Aviation Equipment" now in effect, an aircraft in a class such as the An-28 requires engineer monitoring during technical maintenance. This means that the availability of this monitoring is required at each of the more than 30 fields where we are now flying using the An-2 and where we must fly using the An-28, that is, our enterprise alone needs to have an additional 30 engineers and 60 technicians in order to satisfy the monitoring requirements. And for the Komi Administration of Civil Aviation? For the branch as a whole? It is necessary to seriously think about this problem and to resolve it immediately.

Furthermore, with the degree of An-28 operational deliveries occurring now, the question of how this airplane will be used during the winter, which lasts in our kray for up to seven months, remains unclear and unresolved. During this period, our An-2 airplanes fly using skis, but what about An-28? What ideas did the designers have on this score? It is necessary to say that this question was posed to the designers and manufacturers of the airplane during the operating tests. However, there was no reply and no helping hand extended before the winter of 1986. This means, that from October -- from the time a steady snow cover appears -- An-28 airplanes will halt. It will be impossible to fly in them. It is not necessary to say how this is not in the state's interest. That is why we are counting on an effective reaction to this problem from the designers of the airplane.

The An-28 has required major work connected with lengthening and widening runways and -- here and there -- with significant alterations of a number of local airline airports. It is necessary to say that these problems have been evaluated with understanding by the republic's government.

In all likelihood, the problems, which the appearance of the new airplane in our enterprise has involved, are natural, I am convinced that they will surely be solved.

However, life and the times require a more effective solution to them.

I think that the problem of replacing the An-2 with the new type is an extremely important one for the country's entire national economy. And I would like to invite an exchange of opinions by all interested parties with this article.



## CIVIL AVIATION

### YAMBURG AIRPORT CONSTRUCTION BEHIND SCHEDULE

Moscow VOZDUSHNYY TRANSPORT in Russian 20 Sep 86 p 2

[Article by Yevg. Baulin, VOZDUSHNYY TRANSPORT special correspondent in Yamburg: "Runway Contrasts: Let Us Take Control of Aviation Support For the Gas Condensate Deposit"]

[Text] Yamburg. You will not find this name on every geographical map. To make up for it, it is possible to hear it often in radio and television broadcasts. The polar settlement, which has grown in recent years on the shores of the Arctic Ocean, has become widely known. Today, Yamburg is a watch settlement for builders and gas workers. One can also add -- of aviators -- because an airport collective, which can rightfully be listed among the participants of the largest construction project in the five-year plan, also is working here. True, the airport is still a temporary one. It services a runway for the An-26 airplane which only operates in winter when the severe polar cold freezes the tundra. And a heliport connects several helicopter pads. The helicopters fly here with passengers and freight from Nadym and other cities in our country. From here, they transport specialists, equipment and food for dozens and hundreds of kilometers to the construction sites in the tundra.

The settlement is growing and expanding at rapid rates. Houses are being erected, new streets are built, and the next square meters are being won from the tundra.

It is unusual to see trees in the bare tundra. They are like a confirmation of man's ability to make his dwellings comfortable. The first willows and dwarf birches, which have already undergone two polar winters, have become climatized to the severe polar soil. This year, an extensive planting of greenery has been conducted in the settlement -- hundreds of plantings have been made.

In concept, the construction here primarily consists of the building of a base airport -- a runway with a complex of service installations and premises. In a kray composed of tundra without roads, aviation is the most suitable and still the only permanent type of transport. The railroad does not come here. Freight is transported by water only during the brief months of summer navigation when the Ob River is free of ice. Motor vehicle transport can only be

relied on basically in the winter when the tundra is frozen by the heavy cold, and sled trains are sent on their way over the frozen snow-crust. For the time being -- yes, and for the next few years, only aviation out of the types of transport will reliably service the masters of the new gas deposits. Now, Nadym, where Tu-154, Il-76, An-26, and Yak-40 fly from many of our country's cities, is the base airport and transshipment point for Yamburg. The helicopter Nadym-Yamburg air route is actively operating.

Economists have calculated that passenger transportation to Yamburg has recently increased. During the first half of the year alone, the number of departures grew at an annual level of 30 percent and reached 40,000 people. Of them, 25,000 passengers were able to be carried directly by aircraft to Yamburg. Today they are flying to Nadym and from there they go to Yamburg by helicopter. Operational cargo completes the same route.

The cost of delivering only one watch directly to Yamburg using a An-26 airplane costs 4,000 rubles less than its transportation through Nadym. In a year, this sum will reach two million rubles. According to estimates, the number of departures in 1987 will be 75,000 people. This means that the number of over-expenditures for transporting watch brigades will grow to four million rubles.

... We travelled with P. Kamyshov, the deputy commander of the Nadym Aviation Enterprise, and I. Dendymarchenko, the chief of the Yamburg airport, to the construction site of the new airport. The vehicle travelled over a road made of concrete slabs. To the left and right, the surface of the tundra was covered with mounds. Everywhere there was nothing but saucers of ponds and small lakes. There was a great deal of water on the thawed soil, and it created additional difficulties for the builders. A pipeline, which had been laid from the settlement to the site to supply gas, stretched along the road. It stretched here like a straight thread and there it began to twist like a snake. Technology stipulated this -- to maintain the required pressure force inside the pipe.

We turned left off the road, which went further, to the gas production sites. Another road leads to the new airport, but it is not as well maintained and smooth. Last year, the road builders laid slabs on the frozen soil without sufficient preliminary preparation of it. The soil melted in the spring and the slabs, like boards in a toy sandbox, warped. The builders patched it up a little; however, travelling on such a road is far from being a great satisfaction.

Here is the construction site of the new airport. Its first phase project -- the artificial runway -- must be built according to plan with a length of 1,800 meters to accept the An-26 airplane. Then, it will be lengthened in order to accept more heavily loaded airplanes. The site has a lonely appearance. Roundabout, there is silence and desolation. The bed for further work should have been poured long ago. However, it is still not ready. Only approximately 30 percent of the sand has been poured -- just when the work should be underway intensively. However, there are no dump trucks, which

should be carrying sand, visible. Not a single vehicle with sand has unloaded as yet at the fill for the taxi ways. And they have not begun to construct the aprons at all.

To the side is a depot -- more accurately, a place -- where the cement, which is intended for laying the slabs, is piled. The latter, however, have still not been brought from Tobolsk.

The commissioning of only one runway still does not solve the problem of receiving airplanes. It is necessary to erect the service installations that will insure their operation (there are 20 of them written down in the plan). According to the logic of things, it is necessary to construct them at the same time as the runway; otherwise, they will later delay the commissioning period of the entire project under construction. Moreover, the amount of this work is a considerable one -- 9.6 million rubles. It is not possible to overcome them at one stroke. It turns out, however, that the general contractor (the Yamburggasdobycha [Yamburg Gas Extraction] Association) for the construction of these projects at the complex underway had not until recently concluded contracts with subcontracting organizations. As we see, not even the first organizational step has been made.

Incidentally, concerning these service installations. When meeting with the directors of a number of organizations that are participating in the development of the Yamburg deposit, serious charges were leveled against the representatives of civil aviation (in this case, they are T. Kamyshov and I. Dendymarchenko): Time is passing, and the plans and specifications for outfitting the underway complex have still not been issued. Aeroflot's representatives could answer nothing. However, later when they visited the board of directors of the deposit being built, to their surprise they were convinced that almost all the plans and specifications had already been issued... in April of this year. A seemingly controversial matter has been defined more precisely; however, the reproach addressed to the representatives of civil aviation remains in effect. You see, aviation personnel will be the masters of the airport although it is being constructed using the resources of the gas workers. They should not be indifferent now about how the construction of the new airport is going. I remember that, in a "round-table" discussion that was conducted by the editors of the VOZDUSHNYY TRANSPORT newspaper in April of this year and in which the directors of all organizations interested in developing the Yamburg deposits participated, the representatives of the gas workers stated not without justification that the aviation personnel should assume the role of both consultants and controllers. As yet, they are seemingly adhering to the role of passive-onlookers. This position of the Tyumen Administration of Civil Aviation and the Nadym Aviation Enterprise really deserves criticism because the aviation personnel must actively and daily be interested in questions concerning the construction of an airport where they will have to work. Moreover, things are far from going fine there -- we are convinced of this.

Statistics also testify to this. This year, it was necessary to assimilate 18 million rubles in the construction of the runway. The plans for the first eight

months was 9.94 million rubles -- in actuality, 5.323 million rubles were assimilated, that is, slightly more than half of the plan.

As is evident from this data, the builders "sat too long" at the start of the building of the Yamburg airport and, they are seriously lagging behind schedule today. The demands of the time, the plan and the actual state of affairs are too large contrasts with respect to the runway which is the No 1 installation at the new airport.

In the "round-table" discussion which we recalled above, V. Borisov, the manager of the Nadymdorstroy [Nadym Road Construction] Trust, stated that the road builders would not hold up matters if financing was supplied. But time has shown that the hitch is due to the fault of the road builders who are building the runway. During our last meeting, V. Borisov promised that they would fulfill the annual plan. The lag is large and maximum effort is required to overcome it.

Time does not wait. Today, it is necessary to introduce major corrections to accelerate the progress of the work in building the Yamburg airport.

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## MOTOR VEHICLES, HIGHWAYS

### OFFICIAL ON NEED FOR MORE FILLING STATIONS

Moscow NEDELYA in Russian No 40, 29 Sep - 5 Oct 86 p 2

[Interview with Sergey Rifovich Khabarov, chief of the Filling Station Administration in the RSFSR State Committee for the Supply of Petroleum Products, by Maksim Karpinskiy; date and place not specified: "Where Can You Get Gas?"]

[Text] Before making this interview, I sat behind the wheel of a motor vehicle and travelled over the road closest to home -- to Dmitrov, Dubn and further to the Volga. I went for questions which it would be necessary to pose to my interviewee. The road tossed them up to me continuously. Judge for yourselves: The speedometer "wound" one dozen kilometers after another and there was no signpost with a gas pump on it. The first filling station finally appeared. However, it was only for state motor transport. Another 30 kilometers. Alas, this filling station only filled for coupons. And at the "tail-end" of the kilometers, each filled five tanks because they know that the farther from Moscow the fewer the filling stations.

Thus, the questions accumulated in my notebook. And the first of them was the following: How many kilometers must an automobile travel to the next refueling? With this, I began my interview with Sergey Rifovich Khabarov, the chief of the Filling Station Administration in the RSFSR State Committee for the Supply of Petroleum Products.

[Answer] In principle, all of the questions, which are connected with siting and constructing filling stations, are regulated by definite norms which take into account the average traffic volume on motor vehicle roads and which correspondingly determine at what distance from each other and with what capacity stations should be built. In cities, the number of filling stations is basically determined by city planning construction norms and rules (SNIP). Here, it is thought that there should be one filling station for no fewer than 5,000 motor vehicles.

However, all of the norms are relative. With their help, it is possible to determine the requirements for motor vehicle fuel only in general terms and on the whole, without making any distinction between state and individual transport. Today, when we are building separate filling station networks for the automobile owners and state vehicles, these generalized indicators only distort the picture.

We still do not have any clear-cut criteria for determining the demands for gasoline for personal motor vehicle transport. The fact is that the Ministry of Trade was engaged in planning the market resources and sales of gasoline to the population. Naturally, having taken these functions upon ourselves, we encountered problems that were completely new to us. Up to now, we only handled questions concerned with the supply of petroleum products, and the trade in them -- practically speaking, this is the area of retail trade. And here, there are its own problems-- primarily, inactive and obsolete norms on which it is impossible to rely today. For example, if there are new urban construction projects and it is not authorized to construct filling stations there according to the present norms, does this mean that an automobile owner, who lives there, must travel 30-40 kilometers to refuel? Of course not. It means that some other approach is required.

The previously made calculations of the needs of "private owners" for the fuel, which rely on so-called average annual runs, are also inaccurate. For some reason, it has been accepted everywhere to define them as 10,000 kilometers. Indeed, there is no "average" run for the country -- it is completely different in the central oblasts, Siberia, the north, and the Far East.

Recently, we made the first attempt to determine the actual demand for petroleum products. We distributed more than 500,000 questionnaires, on which respondents were asked to answer, in particular, questions concerning refueling, to the owners of individual transportation through GAI [State Motor Vehicle Inspectorate] and the automobile owners society.

[Question] Of course, the studying of demand is an important matter. You see, however, today -- and this is evident without any questionnaires -- any newly constructed station does not remain without work....

[Answer] Quite true. There are now 4,900 filling stations in the Russian Federation. I would add: Only. According to our population, the filling station network should be increased twofold as a minimum. You see, today more than 30 percent of private transportation is being used by the rural inhabitants. True, the consumers' cooperative society handles the sale of petroleum products, but it is clearly not coping with this task. Evidently, we must assume the construction of the filling stations -- no less than 20,000 new stations! This, one would indeed think, is only the commissioning of new filling stations -- you will not be mistaken. Today, however, our construction capabilities are such that we are being forced to support only the "hottest" spots.

[Question] What is the reason for this?

[Answer] There are several reasons. First, of course, is the financing of the construction of new filling stations. During the current five-year plan, we are directing half of all the capital investments, which have been allocated to us, to expanding the gas station network, having done hundreds of oil tank farms and petroleum product pipelines out of their share in doing this. As a result of these efforts, we will manage to construct only approximately 1,500 new filling stations during these years.

Even with money, however, we are far from able to always build as rapidly as we would like. Our own construction organization is not a powerful one, and the overwhelming majority of new filling stations are being built using the contract method. The contract organizations are fulfilling our orders extremely unwillingly. You see, a station is relatively cheap; in any event, you would not compare it with -- let us say -- a 16-story housing tower. It is the same with service lines -- heat and water supplies, sewerage, and electrical and telephone cables. As a result, such contractors as Agropromstroy [Agroindustrial Construction], Agropromvostokstroy [Far East Agroindustrial Construction], Glavmosoblstroy [Moscow Oblast Main Construction Administration], and Glavmostromstroy [Moscow Main Industrial Construction Administration] have fulfilled the volume of work, which was planned for this year, by only 20 percent -- on the average -- you see, this represents dozens of filling stations that will not be commissioned in time.

Large cities have their own special difficulties. Construction is so dense there that, for example, in Moscow only five-six of the 40 sections, which have been designated for the construction of filling stations can -- in the best of cases -- be recognized as suitable based on sanitary and fire norms.

[Question] Let us return to today. Those few filling stations, which I encountered along the 300 kilometers, only supply gas for coupons that you practically cannot buy enroute. Meanwhile, the discussion about shifting to the sale of petroleum products for cash has already been going on for several years....

[Answer] The coupon system for market stores has not proven itself. In 1983, a decision was made to replace it. You see, however, that one cannot simply replace coupons and shift everything to direct trade for cash. All instructions categorically and -- incidentally, quite correctly -- prohibit the delivery of gasoline at the same filling stations to state transport for common coupons and to private persons for cash. You could not think of a richer soil for various types of machinations. Since state transport will henceforth refuel as before, the shift of individual transport fueling from the coupon system to a cash one is again a question of construction. We are now building a separate individual filling station network only for private automobiles where all petroleum products will be sold only for cash. I will also point out that, when the delivery period of the coupons, which are being acquired today, runs out on 1 February 1987, they will no longer be issued in the RSFSR.

[Question] We are now talking about the sale of gasoline. How about motor vehicle oil? Today, it is also being supplied for coupons although the placard "no oil" has already become common in the majority of gas stations....

[Answer] The questionnaire, which we distributed, has a question concerning oil. The overwhelming majority of motorists prefers to acquire oil in a pre-packaged form and not in bottles. This is completely understandable: A sealed can with a label evokes more trust. It is evident that we will go to meet the consumers and will supply oil to the filling stations in small packages and, naturally, for cash. The main thing, which is delaying us today, is the acute shortage of polyethylene packaging. True, there is still practically nowhere to produce the packaging for the oil. Only the Novopolots, Kuybyshev and Omsk oil refineries are now supplying lubricating material in packaged form. We are, however, receiving from them approximately a third of what we are selling. It is necessary to look for some solution, for example, building small shops for packaging oil directly at the oil tank farms. This however, will not solve the problem of packaging. While waiting to increase its output, it is evidently still necessary to use the usual glass jars.

[Question] You have already touched upon -- true, in an off-hand manner-- the machinations with fuel at filling stations. I must confess that I only managed to return to Moscow thanks to the fact that they found 20 liters of gasoline for me at one of the "combined" filling stations. I paid cash for it. As I now understand, the petrol pump worker, evidently put the six rubles in her own pocket. So much has already been said about embezzlement at filling stations that it would seem every channel for them should have been dammed....

[Answer] The next "queen of the gas pump"?... Yes, indeed, a great deal has been said about this and is being said. And, as a rule, each time they berate us for the fact that things have still not been put right. Honestly, speaking, what can we say about radical changes if science and industry have not provided us with any new systems for measuring and monitoring during recent years? The sounding stick and measuring tape remain the most accurate instrument for accounting for petroleum products at all filling stations and oil tank farms as before. Practically speaking, these antiquated level gauges do not "mark" errors of several millimeters, and, you see, this represents hundreds of tons of fuel. That is why I think that the instrument builders owe a great deal to our branch. True, two new types of gauge levels are now being developed. One of them has already undergone state testing, and the other is ready for it. However, until they begin to be produced and until they arrive at filling stations, a great deal of water -- more accurately, gasoline -- will escape.

Of course, inspections remain.... We have carried out quite a few of them -- not alone but with the participation of procurator, militia and people's control bodies. Last year, we conducted 76,000 surprise and planned inspections during which the delivery of petroleum products was monitored. Common state coupons for 319,000 liters were taken from the owners of private cars who tried to use them to refuel. We sentenced more than 3,000 of our workers for various violations. That number included 340, who were dismissed, and 135, against whom criminal proceedings were instituted. Thus, there is some benefit from inspections. However, it is my opinion that we will receive the



required effect only by increasing their number and by expanding the size of the control apparatus. It is possible to close the channels for plundering completely only by expanding the gas filling network and by using new technical systems for accounting.

[Question] Evidently the rest of the filling station equipment also needs technical re-equipping? In any event, the pumps, from which we take gasoline, force us to think so....

[Answer] Agreed. Pumps now at the stations do not work accurately, are not reliable, and do not satisfy us in their external appearance. Of course, we would replace them with new and more improved ones with pleasure; however, they are not producing these for us.

We are now trying to find a solution with the help of our colleagues from the socialist countries: In accordance with cooperative deliveries, we are receiving drum computers from Czechoslovakia, with which we are completing our pumps. We plan to import Czechoslovakian pumps as a complete unit also. Incidentally, approximately 40 of the pumps are already operating under test conditions in Moscow. As soon as the testing is completed, the volume of purchases will, evidently, increase.

In addition, the Ryzan Punched-Card Machine Plant began serial production this year of a device to record and monitor petroleum products at filling stations.

However, perhaps, it is necessary to consider the work of the Tomsk Automation and Electrical Mechanics Scientific Research Institute the most interesting. A group of Tomsk scientists and engineers has undertaken to conduct research on problems connected with the complete automation of filling stations. A microcomputer, which will receive initial data from all measuring and monitoring systems, will be the center of this system.

[Question] Sergey Rifovich, but all of this restructuring is basically aimed at satisfying the -- so to speak -- internal requirements of the filling station system. What will be done at the filling stations for the consumer? In many countries, stations of this type offer the motorist a whole range of services....

[Answer] Yes, we know, and what is more, in the questionnaires which I have already mentioned, we asked the motorist to tell us what additional services were required by them from filling stations.

[Question] What did they answer you?

[Answer] In the opinion of the majority of motorists, the filling stations should wash cars, change oil and air and oil filters, balance wheels, check them for camber and toe-in, vulcanize inner-tubes, and mount and remove tires. They asked us to sell lubricants, brake and cooling liquids, filters, spark plugs, automotive lights, brake hoses, fan belts, and automotive care products. Many suggested that we begin to sell several industrial goods also.

We think that these requests are completely justified. The opinion, which has existed for many years, that the work of filling stations only consists of refueling and nothing more is incorrect. We have already opened 10 filling stations where technical maintenance posts are operating. They are in Moscow, Leningrad, Penza, and Kuybyshev. Before the end of the year, another 18 republic gas filling stations will be equipped with lifts and washers. It is planned to commission 300 of these stations during the five-year plan. We, however, are experiencing difficulties with equipment: Washing devices and lifts must be purchased in Poland.

We are beginning to organize trade in attendant goods. Unfortunately, there is a shortage of many of them. For example, we receive the Neva and Tom brake fluids in such a small amount that, if we were to "disperse" them to the 200 filling stations in Moscow, it would probably turn out that there would be practically none of these fluids anywhere. That is why we decided, on the one hand, to achieve the best supplying of filling stations with scarce goods, and, on the other hand, to create a network of specialized stores. Seven of these commercial points are now operating in the capital: near the Boykovskaya subway station on Dmitrovskiy highway, in Taganskaya Square, and on Krasnobogatyrskaya Street. Though they are few, in return they are a firm guarantee that everything required can be found in one or the other of them. All told, there are now about 30 of these stores in the republic.

There is approximately the same situation with oil filters for the Zhiguli. This year, we determined a requirement of several million of them; however, the Ministry of the Automotive Industry allotted us only 20,000.

We would like to sell soft drinks, pastries and rolls. We have now sent a request to the republic's Ministry of Health suggesting acceptable forms for this trade. If we manage to solve this question, then it will be possible to have a snack at a filling station after a long journey.

[Question] All of this is good, but how soon will the motorist be able to travel without risking finding himself on the road without a drop of fuel?

[Answer] I do not want to give hopes. If the amount of financing and construction of filling stations is not changed, then not before 10-15 years. Of course, we are also looking for some other ways to solve our problems. We are trying to make arrangements for permission to make broader use of Gosbank loans and to increase the times for paying them back. We are trying to achieve deliveries of equipment above the established norms. Unfortunately, the problems are being solved very slowly -- possibly because the operation and expansion of filling stations is a matter that is deliberately unprofitable. You see, we sell gasoline at the same price that we receive it from the state, and we assume all expenses. For some reason, everyone forgets that the construction of new filling stations reduces empty runs by transport and its non-productive idle time. Speaking to the point, the introduction of additional services at the stations and the expansion of sales at them, possibly will provide some profit. However, be that as it may, in any event we are solving important production and social tasks and have a right, as they say, to count on the most favorable conditions.

For the present, it is possible to say only one thing -- the situation of the motorist on the road will be improved without fail, however, unfortunately, not as quickly as we all would like.

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## MOTOR VEHICLES, HIGHWAYS

### AUTO INDUSTRY ADVISED TO BETTER MEET CONSUMER NEEDS

Moscow ZA RULEM in Russian No 8, Aug 86 pp 1-3

[Article by L. Shugurov, chief, science and engineering department, ZA RULEM, under the "By the Course of the 27th CPSU Congress" rubric: "What Kind of Car Do We Need?"]

[Text] It's not that long ago that all potential car buyers would have answered this question the same way: we need any kind of car. "Not that long ago" means 15 years ago. At that time, industry could supply for retail sale only 123,000 cars of four basic models: ZAZ-966, Moskvich-408, Moskvich-412 and GAZ-24. Under these conditions, the demand far exceeded the supply.

The startup of the Volga and Izhevsk Automotive Plants and the reconstruction of AZLK [Moscow Automotive Plant imeni Leninskiy Komsomol] have made it possible not only to sharply increase car production and, correspondingly, retail sales of cars, but also to expand the selection of models. As a result, 800,000-900,000 cars are entering the retail network annually. Today, there are 26 models and modifications with different engines and body styles (see Table 1), while the total number of personal automobiles exceeds 13 million. Thus, individual sectors of the market have become saturated, and most buyers now have started making very specific demands on the kind of car they want. These demands involve not only the retail price, the gasoline octane number, the gasoline consumption and the maintenance costs; i.e., economic indicators. They also include the passenger capacity and body style, cross-country capability and, naturally, the quality of manufacture. The demand for several makes (Zaporozhets, Moskvich and Niva) has dropped. In order to restore equilibrium between the demand and supply for these makes, retail prices have been decreased in some cases, while in other cases, efforts have been concentrated on improving the quality of manufacture.

Special mention must be made of the retail prices of personal cars. This price must reflect the car's consumer features, design quality and efficiency no less than it reflects other indicators. With the gradual saturation of the passenger-car market, price above all becomes the determining factor in buyer selection. Unfortunately, until recently, the retail price of a car often did not reflect its consumer features. Sometimes, models with noticeably different parameters have almost the same price.

Table 1. Soviet Passenger Cars for 1986

(1) Модель	Год и номер «За рулем» с описанием	Рабо- чий объ- ем, см <sup>3</sup>	Мощ- ность, л. с.	Окта- новое число топ- лива	Колес- ная фор- мула	Число пере- дач	Число мест и две- рей	Дли- на, мм	Сна- ря- жен- ная масса, кг	Время разгона до 100 км/ч, с	Наиболь- шая ско- рость, км/ч	Расход топлива, л/100 км			Роз- нич- ная цена, руб.
												при 90 (14)	при 120 (15)	при ГЦ (16)	
ВАЗ-21013	1982-8	1198	64	93	4×2	4	5-4	4043	955	20	142	7,2	9,8	10,8	7260
ВАЗ-2104	1985-1	1294	69	93	4×2	4	5-5	4115	1020	18,5	137	7,5	10,2	10,2	8800
ВАЗ-2105	1980-6	1294	69	93	4×2	4	5-4	4130	995	18	145	7,3	10,2	10,2	8300
ВАЗ-21051	1982-8	1198	64	93	4×2	4	5-4	4130	995	20	142	7,2	9,8	10,5	8270
ВАЗ-21053	1982-8	1451	77	93	4×2	4	5-4	4130	995	17	152	7,4	10,4	10,6	8350
ВАЗ-2106	1976-10	1568	80	93	4×2	4	5-4	4166	1045	16	154	7,7	10,5	10,7	9100
ВАЗ-21061	1982-8	1451	77	93	4×2	4	5-4	4166	1045	17	152	7,7	10,5	10,8	9100
ВАЗ-21063	1982-8	1294	69	93	4×2	4	5-4	4166	1045	19	145	7,6	10,4	10,4	9000
ВАЗ-2107	1981-5	1451	77	93	4×2	4	5-4	4145	1030	15	152	7,9	10,7	10,9	9720
ВАЗ-21072	—	1294	69	93	4×2	4	5-4	4145	1030	19	145	7,6	10,4	10,4	9700
ВАЗ-2108	1984-11	1289	65	93	4×2	4	5-3	4006	900	15	150	5,9	8,2	8,4	8300
ВАЗ-21081	—	1100	53	93	4×2	4	5-3	4006	900	20	140	5,7	7,9	8,2	Н.д.
ВАЗ-21083	—	1500	73	93	4×2	5	5-3	4006	900	15	155	5,9	8,0	8,6	Н.д.
ВАЗ-2121	1977-5	1568	80	93	4×4	8	5-3	3720	1150	23	132	10,5	13,1	13,4	9000
ГАЗ-24-10 (19)	1985-2	2445	100	93	4×2	4	5-4	4735	1400	18	148	Н.д.	Н.д.	Н.д.	16200
ЗАЗ-968МЗ (20)	—	1198	45	76	4×2	4	4-2	3765	840	35	123	7,4	—	10,5	4100
ЗАЗ-968М (21)	1980-1	1198	41	76	4×2	4	4-2	3765	840	38	118	7,4	—	10,5	3900
ЗАЗ-968М-005 (22)	—	887	28	76	4×2	4	4-2	3765	820	28	102	7,8	—	12,0	3500
ИЖ-412-028 (23)	1982-6	1478	75	93	4×2	4	5-4	4199	1045	19	142	8,0	10,6	11,3	7100
ИЖ-21251 (24)	1982-6	1478	75	93	4×2	4	5-5	4196	1100	19	142	8,3	10,8	11,3	7400
ЛуАЗ-969М (25)	1978-10	1198	40	76	4×4	5	4-3	3390	960	36	90	10,0	—	Н.д.	5100
«Москвич-2140»	1976-1	1478	75	93	4×2	4	5-4	4250	1047	19	142	7,9	10,5	10,8	7300
«Москвич-21406»	1979-2	1478	68	76	4×2	4	5-4	4250	1080	25	132	9,2	12,6	13,9	7100
«Москвич-2140-117»	1980-1	1478	75	93	4×2	4	5-4	4250	1036	19	142	7,9	10,5	10,8	8000
«Москвич-2141»	1986-5	1478	72	93	4×2	5	5-5	4350	1080	17,8	155	5,9	8,0	9,9	Н.д.
УАЗ-31512-01 (27)	—	2445	80	76	4×4	8	7-5	4025	1590	24	110	11,3	Н.д.	Н.д.	14500

## Key:

- |  |                  |
|--|------------------|
| 1. Model   | 14. at 90 km/h   |
| 2. Year and issue of ZA RULEM in which described | 15. at 120 km/h  |
| 3. Engine displacement, cm <sup>3</sup>          | 16. city driving |
| 4. Power, hp                                     | 17. Retail price |
| 5. Fuel octane number                            | 18. VAZ-         |
| 6. Wheel arrangement                             | 19. GAZ-24-10    |
| 7. Number of speeds                              | 20. ZAZ-968ME    |
| 8. Seating capacity and number of doors          | 21. ZAZ-968M     |
| 9. Length, mm                                    | 22. ZAZ-968M-005 |
| 10. Outfitted weight, kg                         | 23. IZh-412-028  |
| 11. Acceleration time to 100 km/h, s             | 24. IZh-21251    |
| 12. Maximum speed, km/h                          | 25. LuAZ-969M    |
| 13. Fuel consumption, liters/100 km              | 26. Moskvich-    |
|  | 27. UAZ-31512-01 |

## Notes:

1. VAZ-2104, VAZ-2108, VAZ-21081, VAZ-21083, VAZ-2121, LuAZ-969M, Moskvich-2141 and UAZ-31512-01 come in station-wagon, combi or hatchback models.
2. For the ZAZ-968M-005, LuAZ-969M and UAZ-31512-01, the acceleration time is to a speed of 80 km/h.
3. For the LuAZ-969M and the UAZ-3152-01, the fuel consumption is shown for a speed of 60 km/h.

4. The maximum speeds and acceleration times are for cars with a driver and one passenger.
5. The city-driving fuel consumption is determined by the method described in ZA RULEM, No 10, 1985.
6. The table does not include modifications with hand controls provided by social welfare agencies.
7. H.A. indicates that data are lacking.
8. The retail price is taken from the USSR State Committee on Prices price list and is the base price; i.e., not taking into account increases or decreases due to options. The exact price in each specific case can be obtained from a salesperson at the store.

The question of bringing order to pricing policy was posed at the June 1986 CPSU Central Committee Plenum. The principle that the retail price must objectively correspond to the consumer features is not the last thing which should be taken into account when solving this problem. The automobile is no exception to this.

In general, the automobile today has gained a solid place among consumer durable goods (as it is categorized in statistics). Evidence of this is the "Integrated Program for the Development of Consumer Goods and Services for 1986-2000," which provides for increasing the technical level of cars, more completely satisfying the demand for them, improving car quality and expanding the selection of available models.

In order to fulfill these tasks, our automotive plants in the coming years must fully upgrade all their models, with a significant improvement in consumer features. In addition, they must significantly expand the range of models and modifications of both present and future cars.

VAZ [Volga Automotive Plant], ZAZ [Zaporozhye Automotive Plant] and AZLK will offer front-wheel-drive models in the new five-year plan. These automobiles have lower metal content and better consumer features, which is why they have appeared on the conveyors of the world's best automotive plants (ZA RULEM, No 2, 1982). The proportion of front-wheel-drive cars worldwide will increase steadily.

What has been and is being done in this direction? The front-wheel-drive, 3-door VAZ-2108 is already being produced; last year, VAZ produced 21,000 of these cars out of its total of 724,000, and it plans 85,000 this year. In the future, this family of automobiles will make up one third of the plant's total output.

Next in line is the VAZ-21081, which is a VAZ-2108 with an 1100-cm<sup>3</sup>, 55-hp engine. Equipped with a 4-speed transmission, this car will be more efficient than the VAZ-2108, with a city fuel consumption of 8.2, compared with 8.4 liters/100 km.

The VAZ-2109, which is the 5-door version of the VAZ-2108, is to come off the conveyors in 1987. A test lot of the cars will be manufactured in 1986, as specified in the plant's socialist obligations.

If we return to the plant's present production program, then we won't find the VAZ-2102 station wagon. This has been completely replaced by the VAZ-2104 station wagon, 50,000 of which will be manufactured in 1986.

Along with the VAZ-2108 and VAZ-2104, the VAZ-21013 (a representative of the very first generation of Zhuguli) is still being produced in fairly large quantities (18-20 percent). The Niva is at full production of about 250 cars per day (about 10 percent), which amounts to more than 70,000 cars per year. The model with the highest production is the VAZ-21061: it, along with the VAZ-2106, accounts for 30-31 percent of total production. Following it are the VAZ-2105 (13-14 percent) and the VAZ-2107 (10-11 percent).

Perhaps the Oka (officially designated the VAZ-1111) is arousing the greatest interest among automobile enthusiasts, particularly the urban driver. This car, which is a group-2 sub-compact, has already been discussed in this magazine (No 7, 1984, and Nos 1 and 6, 1985). This is a front-wheel-drive car which is small (3.2 m long), light-weight (610 kg) and efficient (about 6.6 liters/100 km, city driving). It also has an affordable price. Therefore, many are pinning their hopes on and giving particular attention to the Oka. Newspapers, taking this into account, have given information on some of the car's technical data. But the series-produced car probably won't have these data or the above parameters, and the car probably won't look like the experimental models (ZA RULEM, No 1, 1986). VAZ, KamAZ [Kama Automotive Plant] and the Serpukhov Motorcycle Plant are to combine efforts to begin producing 50,000 cars per year of the new model in 1988. Finally, of course, it is premature to talk in detail about the car while tests are continuing and design changes are being made.

However, any plant always jealously guards its prototype models. The development of a new model is a complicated creative process lasting for 5-8 years. The process involves many difficulties, and it is hardly possible to seriously evaluate the work of a large collective when that work is only half finished. We won't forget about the foreign competition either (this is now a reality, since about 250,000 Soviet cars are being exported) and the need to prevent the leak of information before the legal documents are submitted for the industrial prototypes, inventor's certificates and patents.

Therefore, until very recently, AZLK has not given very many details about its planned 2141 model (ZA RULEM, Nos 5 and 6, 1986), and little is known about the front-wheel-drive VAZ-2110. The first prototypes of this latter car have been built, and it will become the base model for a whole family of models to be produced in the 13th Five-Year Plan.

After CPSU Central Committee General Secretary M. S. Gorbachev called on VAZ workers and engineers to become the trend-setters in automobile style and to develop the best examples of automotive engineering in the world, the collective of the Administration of the Chief Designer [UGK], which includes over 2000 people, accepted this challenge. Along with work on the VAZ-2110 car, the UGK is directing its efforts to develop a design reserve of at least 5 years as quickly as possible, in order to provide the foundation for the models in the 13th and 14th Five-Year Plans.

One of the designers' main tasks is to sharply reduce the lead times for new-car development. A basically new design requires 8 years or more from the beginning of design work to the start of production.

However, let's return to the new models which will be introduced in the coming years. In the second half of 1987, the front-wheel-drive ZAZ-1102 with a 50-hp, 1000-cm<sup>3</sup> engine will begin to come off the production line. Presently, a new assembly plant is being constructed at Kommunar, and the enterprise collective is preparing for equipment installation. By the 27th CPSU Congress, the plant had manufactured 30 prototypes of the new model, and by the end of the five-year plan, when the ZAZ-1102 is in full production, 153,000 of these cars will be produced annually.

As did ZAZ, AZLK in Moscow assembled a prototype lot of its future cars. At the end of the year it is beginning series production of the Moskvich-2141, which is to completely replace the 2140 by 1988. In the next year after that, the annual production level will reach 160,000.

Production of the IZh passenger cars in Ustinov will be about on the same scale. But funds for reconstructing the production facility, manufacturing tooling and acquiring machine tools and equipment could only be allocated at the beginning of the year. Therefore, production of the IZh-2126 will start not earlier than the final year of the five-year plan.

GAZ [Gorkiy Automotive Plant] is planning by 1990 only to modernize its well-known models GAZ-3102 and GAZ-24-10, which are produced simultaneously.

Readers' letters sometimes contain the following reproach: "Really, can't they (at some plant) do ...?" They can. But at the present level of automotive design and production technology, the scale of the concept "can" is largely determined by financial and material capabilities. These capabilities are not limitless, and the funds invested in various economic sectors must be carefully balanced. The scale of automobile production could be sharply expanded, but then shops or plants to produce more sheet steel, tires, batteries and gasoline would have to be established in direct proportion to this. Automobile enthusiasts more than once have felt the results of unbalance in the plans of supplier sectors; for automobile manufacturers, there are dozens of supplier sectors and subsectors.

Our economy is undergoing a period of basic restructuring, aimed at: 1) making all production subject to demand and to satisfying public requirements, 2) accelerating scientific-technical progress and 3) improving the efficiency of the entire management mechanism. Obviously, the plans for the future development of sectors will be more carefully coordinated and these plans will take better account of consumer needs. During this restructuring, the Ministry of the Automotive Industry must establish more effective feedback from customers. This feedback is now still weak with regard to passenger-car production, and consumer needs are not taken into account sufficiently.

Take personal cars for rural areas. The percentage of these cars reached 33.9 percent out of the total individual means of transport. But among the several million cars operated by rural residents, only 4.4 percent had



enhanced cross-country capability: the LuAZ-969M, VAZ-2121, GAZ-69A and the UAZ-469B. In the country's largest republic--the RSFSR--improved roads (that is, concrete, asphalt-concrete and blacktop roads) make up only 40 percent of the total. That's the average. If we're talking about rural areas, then you don't even find gravel roads (which are not classified as paved roads) that often, and automobiles with good cross-country capability are critically necessary. Compared with the needs of the population, we produce few of these cars, both in number and selection. None of the four-wheel-drive cars come in various body styles, with several wheel bases or with gasoline and diesel engines. In short, the Japanese automotive industry, which supplies 4-wheel-drive automobiles to many countries in Asia, Africa and Latin America, produces 7 families of models, encompassing 54 modifications. We still can offer rural residents only three models, and these in very small quantities.

Because of the time factor, we must consider restructuring the future line of passenger cars and including new groups of four-wheel-drive cars. It will take several years for industry to develop and test the new cars which will be included in the new line. Therefore, as a temporary measure, we must quickly start producing rural modifications of the Lada, Moskvich and Zaporozhets. This is probably not too difficult. Existing car models could be made somewhat suitable for rural roads by equipping them with high-mileage tires, protective bottom plates and towing eyes (as, by the way, is the case with the Moskvich-21406, which is being produced in limited quantities) and a very simple positive differential lock mechanism.

However, theoreticians can come to the opposite conclusion: differential lock, in the hands of an inexperienced driver, means increased fuel consumption, greater tire wear and the risk of breaking axles and other transmission parts. This is all true, but the lock makes it possible (both practically and theoretically) to get out of mire and continue driving. Clearly, such a modification is only a half-measure, but it should be taken until industry is able to provide rural drivers with 4-wheel-drive cars such as the experimental Moskvich-416 (ZA RULEM, No 8, 1980); i.e., light-weight 4-wheel-drives based on series-produced assemblies.

One other important factor has not been taken into account by the automobile manufacturers or by the retail network (we're not mistaken when we say that regard for customer needs is insufficient). Out in the country, 100 or more kilometers from a rayon center, where can you find AI-93 gasoline for your car? In most cases, the many organizations which supply fuel to rural regions have only tanks for one type of gasoline (usually A-76), which is used for trucks. Thus, the Volga Automotive Plant probably must do the same thing as AZLK and GAZ and produce modifications of its cars, above all the Niva, which can run on A-76. By the way, the fact that the ZAZ-968M, Moskvich-408 and Moskvich-21406 run on that gasoline is the primary attraction of these cars for rural drivers. Therefore, these models make up more than 40 percent of the personal cars in rural areas, although few of these cars are produced.

The problem of reducing the costs of motorization deserves constant attention. Let's take service. The number of personal cars is increasing, and most of them are designed to be serviced and repaired mainly by STO's

[Technical Service Stations]. The network of service stations is being expanded, but the demands for their services are outstripping this expansion. Should more and more STO's be built? However, we know that the country's labor resources are limited. Maybe an automobile should be designed which requires minimum in-station service. The present level of automotive engineering can achieve this, and this problem was discussed at one time in this publication (ZA RULEM, No 9, 1977). Apparently, the greater complexity and cost of these cars (hydraulic tappets, solid-state ignition, permanently lubricated bearings and maintenance-free batteries) will be offset by the reduced costs of building and equipping numerous STO's and paying the personnel in them.

There's one more vital problem. Taking into account the higher demand for efficient small cars for city driving, the question of production volume should be reconsidered before production of these cars begins. Obviously, an annual production of 50,000 of the least-expensive car, which the Oka promises to be, is clearly insufficient. The demand for this car is incomparably greater.

Consumers want to be able to choose from front-wheel-drive, four-wheel-drive and rear-wheel-drive cars. They want not just hatchbacks, but also station wagons, sedans, coupes (see the insert in this month's magazine) and four-passenger cars with a small load platform instead of a trunk. The driver wants to purchase a model which operates on low-octane fuel or has better cross-country capability. Drivers prefer a two-tone paint job and would gladly buy a car equipped with air conditioning.

It is now time to study the consumer demand more comprehensively and thoroughly and try to find ways to satisfy it and to provide the consumer with a full description of the car's performance. This is the essence of restructuring in accordance with the present demands. This means that automobile manufacturers must give the Soviet driver the proper car for the specific operating conditions.

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## MOTOR VEHICLES, HIGHWAYS

### CONSTRUCTION, RETOOLING PROBLEMS DELAY ZAZ-1102 PRODUCTION

Moscow PRAVDA in Russian 3 Oct 86 p 2

[Letter to PRAVDA from T. Milushin, a lathe operator in the Kommunar Motor Vehicle Works and Hero of Socialist Labor; S. Berezhmoy, a milling-machine operator in Kommunar and Hero of Socialist Labor; A. Zinchenko, adjutor and delegate to the 27th Ukrainian Communist Party Congress; L. Pokholok, a heat-treater in the motor works and a delegate to the 27th CPSU Congress; Ye. Fomina, a milling-machine operator in the motor works and a deputy to the USSR Supreme Soviet; S. Semekhin, a metal worker in the Kommunar works and temporarily a brick-layer; S. Mamoshin, a metal worker in the Kommunar works and temporarily a brick-layer; and M. Pedash, a metal worker, secretary of a shop Komsomol organization and temporarily a brick-layer: "There Is A Roof, But There Is No Floor...."]

[Text] The commissioning of capacities for producing the new ZAZ-1102 subcompact is being intolerably delayed.

It has been calculated that the state will receive 500 million rubles of net profit annually from the production of new model Zaporozhets-- when the design output of 150,000 items a year is reached. In comparison with the model now being produced, the expenditure of metal will be reduced by 20,000 tons and 40,000 tons of gasoline will be saved when operating this vehicle.

According to the plan, the collective of the AvtoZAZ Association should begin producing the new model during the fourth quarter of next year. It should. However, will we be able to fulfill the government's task within the designated period?

The association's leading enterprise -- the Kommunar works -- long ago moved into its second century. What have they not produced within its old walls -- agricultural implements, reapers, combines, and trailers. The first Soviet subcompact came off the works' production line in 1960. Today, while preparing to produce a new model, a number of shops will still function in structures that are 123 years old.

When the question of producing the ZAZ-1102 vehicle arose, a decision was made to build new facilities at the association's works. Ministry of Installation and Special Construction Work organizations and others are carrying out

the capital construction. We have no large claims against the Ministry of Installation and Special Construction Work builders. Here, they know how to keep their word although they have sufficient difficulties with workers and with supply. However, the Melitopolmashstroy [Melitopol Machine Building] (Comrade Pokrovenko) and Zaporozhalyuminstroy [Zaporozhye Aluminum Construction] (Comrade Belenkiy) trusts have placed the association's works in an extremely difficult situation.

At the Melitopol Motor Works and Avtogidroagregat [Automotive Hydraulic Unit Association] the roof has not even been closed on the new buildings, the power-generating unit and the auxiliary structures; and the work is now being performed very slowly -- and on the threshold of winter. At Kommunar, the assembly building has both a floor and walls, but it is impossible to install equipment here. There is a total of 56 million rubles of it in the association's warehouses -- a very large amount of it was imported for which money has been paid.

The general contractor of the Kommunar Motor Vehicle Works -- the Avtostroy Construction Administration (its chief is Comrade Levitskiy) -- is carrying out its duties poorly. There has not been a single builder in the shop for plastic items since January. Understanding that there is a shortage of workers in the administration, the shop itself has performed the work to prepare the foundations and has installed 11 thermoplastic automatic machines. They are now standing amid mud like coffins under a black shroud.

The builders say that there are no brick-layers. The works has taken 20 people from their principle work and earmarked them. However, they stand around for a half shift almost daily and the plant must pay them up to the average wage. There is no cement, there is no mortar, there is no brick, and there is generally speaking no mechanization.

Without waiting for complete construction readiness, they have begun to install equipment in the bodyshops. When beginning the installation, we thought that we would hurry the builders by this. It was in vain, however; five-six people are working on one shift. Besides the floors, you see, it is necessary to perform plastering and painting work, close the openings and bring in the power supply. The high-voltage equipment will be able to operate effectively only when there is an above-zero temperature in the shop, and the work on building the boiler room is only half finished.

Under such capital construction conditions, it is hardly possible to begin serial production of the ZAZ-1102 model in 1987. You see, it underwent state tests in 1982 and was recommended for production.

Responsible workers from union and republic ministries and Yu. Boyev, the deputy chairman of the USSR Gosstab, have come to the works. Three ministers -- interested parties -- came to an understanding and issued a joint order: Insure the timely commissioning of the facilities. However, no changes for the better can be seen at the construction project. We workers would like to receive an accurate reply from the ministers through the newspaper PRAVDA: Will the association's works be built in accordance with the decision that was made in May 1985?

## MOTOR VEHICLES, HIGHWAYS

### IMPROVED GAZ-3403 TRACKED ATV IN PRODUCTION

Moscow ZA RULEM in Russian No 8, Aug 86 p 9

[Text] The GAZ [Gorkiy Automotive Plant] Association has begun producing the GAZ-3403 tracked ATV. This is a further development of the present GAZ-71 model (ZA RULEM, No 2, 1973). Among the most important new features is a rubber-metal crawler belt. The track race and the track connecting pins are coated with a layer of special rubber. As a result, the track service life is more than doubled (from 5000 to 12,000 km) and track noise is greatly reduced. The ATV also has an improved torsional suspension for the support rollers and a more powerful engine. It has a greater range (600 km instead of 400), a higher maximum speed (60 km/h instead of 50) and a 25 percent greater load capacity.

The GAZ-3403 is equipped with a 120-hp GAZ-53 engine, as well as a number of series-produced automotive assemblies, which simplifies repair. The body has a canvas cover, a self-contained heater and fold-down seats for 10 passengers. The machine can transport 1.25 tons of freight and tow a trailer with a gross weight of 2 tons.

With a weight of 4410 kg, the ATV applies very little pressure to the ground, making the ATV very capable of traversing snow, sand, mud and swamps. The GAZ-3403 does not leave tracks on the ground and does not even disturb the grass cover. In the development of new regions (for which tracked vehicles are widely used), the GAZ-3403 will have a minimal destructive effect on the soil.

As is its predecessor, the GAZ-71, the new vehicle is designed for use in prospecting, building gas and oil pipelines, construction and transporting people and freight in hard-to-reach areas. The ATV is well equipped for northern service and can float across water obstacles. Taking into account the scale of new construction and development in northern regions, the GAZ Association has decided to build a 25,000-square-meter assembly building and a number of other shops at its Transvolga Crawler Tractor Plant.

The first commercial lot of GAZ-3403 ATV's was produced by the opening of the 27th CPSU Congress.

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## MOTOR VEHICLES, HIGHWAYS

### KUYBYSHEV VEHICLE PARTS PLANT MODERNIZATION LAGGING

Moscow EKONOMICHESKAYA GAZETA in Russian No 37, Sep 86 p 16

[Article by V. Ulyanov, EKONOMICHESKAYA GAZETA special correspondent in the city of Kuybyshev: "A Robot Does Not Need A Hammer"]

[Text] At the Kuybyshev Tractor Electric Equipment Plant, the most primitive technological processes get on with automatic machine tools and robotic systems. Almost 39 percent of the workers are engaged in manual labor today. This is twofold higher than the average plant level for the percentage of manual labor in assembly and winding works.

The technical re-equipping of the enterprise, which has been started, must fundamentally change the present situation. During the years of the 12th Five-Year Plan, it is necessary to introduce into the shops and sections more than 720 units of diverse equipment, build a set of mechanized production lines, and "stuff" production with automatic equipment. This will permit 38 percent of the workers, who are now engaged in manual operations, to be freed.

Today, however, the effectiveness of the technical re-equipping, which has been begun, already seems problematical if the structure of production itself is not radically changed. Judging from everything, this avenue has still not received the necessary development in the enterprise, and the program for reducing the percentage of manual labor has now already suffered a malfunction: This year, it is planned to reduce manual operations by only one percent.

There is a reason for this. The set of production lines, which is being built, is in no way "connected" with the excessively inflated nomenclature of items being produced by the enterprise. The works produces 46 types of generators alone. To assemble them, the machine, die-stamping and foundry shops must manufacture 6,000 types of items. During the current five-year plan, it is planned for the factory to master the production of another eight types of generators. This will require an additional amount of complete equipment sets. Considering the fact that mechanized lines are able to be adjusted for the production of only two-three types of items, it is practically impossible to arrange the production of all modifications of generators on them and, consequently, dislodge manual labor in accordance with the planned program.

Meanwhile, the collective has real conditions for significantly reducing the nomenclature of the items being put together. They consist of standardizing the electrical equipment and making maximum use of the same kind of assemblies and items in the designs. According to the calculations of the works' specialists, it is sufficient to keep 24 standard types of generators in production out of the 46, which are being produced now, without harming motor vehicle and tractor building enterprises. In particular, the works' designers have developed the 37,3701 generator that is not inferior to the best foreign ones. In the near future, it will replace all types of generators manufactured for the basic Zhiguli. This will permit the nomenclature of component items to be reduced by a third. This generator will also be mounted on the new Zaporozhets model vehicle.

The standard 64,3701 generator, which has been built on this base also, will replace four obsolete modifications that are being supplied to the Ulyanovsk Motor Vehicle Works. Its introduction will insure an annual savings in the amount of 313,000 rubles and a savings of 234 tons of steel and 163 tons of nonferrous metals. However, the efforts and wishes of the Kuybyshev workers alone are not sufficient to solve this task.

M. Panov, the chief engineer of the works, has said: "Today, we are offering motor vehicle works standardized generators with optimum technical and economic parameters. Many enterprises, however, have not agreed to adapt to these instruments although special trouble is not required. On the contrary, they are trying to pass on to us technical specifications for developing special modifications of generators for each new vehicle model.

The Kuybyshev workers, for example, have been pressing a long lawsuit against the Gorkiy Motor Vehicle Works to which they are delivering about a dozen types of generators. In preparing for the production of the new diesel motor vehicle, the Gorkiy workers have demanded the designing of a generator with increased power based on the old one. To do this, it is necessary to modernize the basic model radically, restructure production for the output of the new generator and master the manufacturing of original components. In order to eliminate the expenditure of labor and materials that accompanies this, the Kuybyshev workers have proposed putting together a diesel engine using the 37,3701 generator, which is being built for AvtoVAZ and which completely corresponds to the technical conditions that have been imposed. The motor vehicle workers, however, are refusing to make the small changes in the layout of the engine. The protracted dispute has engendered enormous correspondence between the interested parties and it is still continuing -- the matter is standing still. Evidently the decisive interference of the Ministry of the Automotive Industry is required here.

Incidentally, it is necessary for the ministry to display good management in another -- no less important -- matter since the plans and specifications for the technical re-equipping of the Kuybyshev works have still not been reinforced with clear-cut long-range plans for the arrival of equipment, and the circle of supplier enterprises has not been determined. Generally speaking, industry is not producing many types of the needed special machine-tools.

In this connection, the two machine-tool building shops, which have been built at the works and which are producing special production equipment -- winding, insulating and impregnating machine tools, are acquiring special importance. Dozens of original automatic winding machines have already been assembled based on the sketches of V. Yablokov, a designer and inventor in the works. Requests for the manufacturing of special machine-tools arrive here from all of the shops in the works. Only a small portion of them, however, is satisfied. Excellent design ideas, which are aimed at eliminating manual labor, often remain on paper. For example, that same V. Yablokov found a design to automate the feeding of a steel sheet to the press. He has been trying for several years to achieve the introduction of the innovation, but without results. The workers feed the 10-kilogram steel sheets manually as before.

According to the estimates of the enterprise's engineering services, the scope of its own machine-tool building must be increased twofold as a minimum. That is why the technical re-equipping should logically begin with these sub-units. However, the management of the works is not listening to its specialists, adhering rather to a different opinion: Auxiliary means secondary. How else to evaluate the fact that during the next two years they do not plan to replenish the machine-tool pool of these shops and replace obsolete equipment with advanced, although the production volume of the new equipment is designed to be increased by 80 percent?

Today, the planning of the work of its own machine-tool building shops does not direct the collectives toward the achievements of high end results. Production output expressed in cost continues to be the main indicator for them. That is why it frequently turned out that the machine-tool building shops do not provide any real return to the works when the plans are fulfilled on paper. Why shouldn't these questions be discussed in the collective as the instructions of the 27th party congress and the June 1986 CPSU Central Committee Plenum require?

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OFFICIALS ON DIFFICULTIES OF NOVOSIBIRSK METRO CONSTRUCTION

Moscow TRANSPORTNOYE STROITELSTVO in Russian No 9, Sep 86 pp 15-17

[Article by S. A. Smirnov, chief, Novosibirskmetrostroy; Yu. G. Samochernov, Chief engineer, Novosibmetroproyekt project and B. V. Koryakin, senior science associate at SibTsNIIS [Siberian Central Scientific Research Institute of Transport Construction]: "Problems of Metro Construction under Harsh Climate Conditions"]

[Text] The Novosibirsk subway system is being built under climate conditions more harsh than for any existing system of system under construction. This has a substantial practical effect on all stages in the organization of construction, compelling us to plan to perform specific operations during the summer, and leave for winter only those operations whose performance and quality will not be affected by subzero temperatures.

As the 6-year experience in construction has shown, operations affected by harsh climate include the preparation, transportation and, most of all, the hardening of cast-in-place concrete at subzero temperatures; working frozen ground to insure standard noise and vibration values; preventing the soil at the foundation of subway system structures from freezing; finishing work at the stations; driving and removing piles and insuring satisfactory temperature ranges while operating the subway system.

During construction of the start-up complex of the first line, a part of these operations (most of the ground work, driving and removing piles) were carried out successfully in the summer time by working on a significant number of fronts at the same time, simultaneously constructing 6 stations, the subway run in the foundation pit, the depot and the engineering building. A relatively small amount of work on the ground, both at the surface and on the second and third benches of the foundation pits was done using tractor-mounted cultivators. However, this significantly reduced productivity and the amount of time to do the work (in connection with the fact that in Novosibirsk, the depth to which soil freezes exceeds 2 meters, in certain years 2.5 meters), and did not provide for the standard levels of noise and vibration. During construction of the second part, when the possibilities for opening the working front are limited, it is being proposed that we perform experimental work to select a means for protecting the ground from freezing, including pre-cultivation of the ground on the second and third levels of the foundation pits and covering the ground surface with thermoinsulation material, foam in particular.

In designing the subway system structures for the open operation of the first line, and considering the specifics of the harsh climate conditions, we strived to make the greatest use of precast structures, the level for which reached 62.7 percent. However, the amount of cast-in-place concrete remained high. We had to do part of this work during the winter (Table 1). In planning this work and how to carry it out, we used the "Manual for Concrete Work under Winter Conditions, in Regions of the Far East, Siberia and the Far North" (Moscow, Stroyizdat, 1982) as applicable to the chapter of SNiP [Construction Standards and Rules] 111-15-76.

The average number of days per year when it is necessary to take special measures when doing concrete work in accordance with the aforementioned chapter of SNiP is 163. Moreover, in accordance with the "Manual," "It is necessary to consider laying the concrete mix at temperatures below  $-25^{\circ}\text{C}$ . to  $-30^{\circ}\text{C}$  as a forced measure, leading to significant difficulties in performing the work and increased expenditure of power resources." The average number of such days in Novosibirsk is 22, with some years having 45 and more. Taking into consideration the fact that such temperatures can continue the entire winter period and that it is impossible to plan for their onset, organization of winter concreting of subway system structures in Novosibirsk is a complicated task, as the construction experience shows.

Preparation of the concrete at the plants led us to heat the ingredients. Delivering the concrete to the place it is to be poured presented certain difficulties due to the fact that the distance from the construction site was 20-30 kilometers; however, when we got 3 SB-92 cement mixer trucks in 1984, the difficulties were overcome to a significant degree.

Three methods recommended by the "Manual" were successfully used in laying and curing concrete under the winter conditions. A preliminary analysis of the possibilities for using the remaining methods, pointing out the necessary studies to precede their use, is shown in Table 1. It must be pointed out that the general trend for resolving this problem remains to increase the extent to which structures can be precast, including construction of single-vaulted stations in a wholly precast version, and reducing the number of standardized dimensions for precast designs.

The experience in using the "Manual" showed, in particular, that doing concrete work under harsh winter conditions during construction of the subway system is, as a rule, a labor intensive and costly operation. This is explained by the fact that the surface modulus of the designs (the ratio of the sums of the areas being cooled to their volume) are great. To maintain the temperatures needed for concrete to harden a rather large amount of additional heat must be supplied, and regulating the heat as a result of the sharp drops in winter temperatures in the continental climate of Novosibirsk calls up additional difficulties for insuring work quality.

Concreting structures under winter conditions in accordance with the requirements of Point 5, Chapter 1 of SNiP 111-15-76 should be done according to special flow charts which have not yet been worked out. The Novosibirsk department of SKTB [Special Design and Technology Bureau] of Glavtonnellmetrostroy has begun compiling an album of standardized decisions, however they were

unable to complete the work due to the great labor intensiveness of each such calculation, since the number of standardized dimensions for the structures on the first line, and, consequently their surface moduli exceed a hundred. The lack of such ancillary documents causes significant difficulties when drawing up individual projects for doing the concreting work on each small object.

Table 1

Method for laying and curing cast-in-place concrete and reinforced concrete	Concrete volume, $m^3 \times 10^3$	Notes
In specially constructed enclosures	1.9	Shows promise
Using subway system station and subway run tunnels as the enclosures	3.8	As above
Using a thermal insulation method for curing within the structure	---	Inapplicable as a rule, due to high values for the structures' surface moduli
With antifreeze, accelerating and air-removal admixtures	---	Application restricted by the availability of constant electric current during use
With electric pre-heating of the mixture before laying in form	---	Shows promise for structures with surface modulus less than 12
Heating concrete electrically	13.2	Shows promise for concrete structures; difficult for reinforced concrete structures due to the high percentage of reinforcement. Requires experimental testing.
In a thermosetting [Rus. 'termo-aktivnaya'] form	---	Requires design work-ups and experimental testing
With induction and infrared warm-up, heating the concrete with hot air and steam heating	---	As above

It is apparently necessary to follow a complicated route to the development of a technically efficient subway system station design for harsh climate conditions. This design should specify maximum construction with prefabricated modules, including that of the single-vaulted station, reducing the number of standardized dimensions for the structures to this end, working up standard flow charts for winter concreting of the subway system structures and scientific research studies and experimental testing of winter concreting methods applicable to subway system facilities. All of these measures should exclude winter concreting to the maximum extent possible.

Table 2

Metro Station	Volume being heated, m <sup>3</sup> x10 <sup>3</sup>	Electric power costs, thousands of kWh per season		Heating costs, thousands of rubles per season	
		1983- 1984	1984- 1985	1983- 1984	1984- 1985
'Krasnyy prospekt' (Red Prospect)	14.6	1596	1637	47.8	49.1
'Ploshchad Lenina' (Lenin Square)	14.0	1646	1261	49.3	37.8
'Oktyabrskaya' (October)	12.3	1068	1017	32.0	30.5
'Rechnoy vokzal' (River Terminal)	5.7	1112	1256	33.3	37.7
'Studencheskaya' (Student)	14.8	1469	1590	44.0	47.7

The indicated difficulties may in part be overcome (primarily while doing the finishing work) using the ready-made structures of the stations and track runs for the heating enclosures, heating them electrically or with hot-water radiators. This method was widely used by Novosibmetrostroy in the construction of all 5 stations in the first phase (Table 2). For heat they used the STD-300 heating unit, the KTP-630 B integrated transformer substation for heating concrete, the SFO-40 electric radiator, the TG thermogenerator and heating units rated from 4 - 10 kWt of our own manufacture.

We did the laying of concrete, the setting of marble and granite, surface working, painting and other finishing work at above-zero temperatures. Where there are additional, set costs, the indicated method was the only possible technical solution which permitted us to get the subway system stations ready for submittal on a broad front by the targeted deadlines, using the winters of 1983-1985 to this end.

It is expedient to do the earth work and concreting the trough in summer so as to increase construction quality, reduce labor costs expenses, leaving the installation of precast structures and a number of other operations which may be carried out at below-zero temperatures until winter. However, in doing this, it is difficult to meet the requirement of point 2.1, chapter 3.02.01-03 of SNiP, which states, "...when soils are used as natural foundations, construction methods should be used which do not permit a deterioration of soil properties and the quality of the readied foundation due to...freezing." It is understandable that at the low below-zero temperatures which are characteristic of Novosibirsk, the process of through-freezing for an open foundation proceeds with extreme intensity, with through-freezing of the upper layer of soil, which takes the stress, occurring during a period of several hours. Special measures

must be taken to avoid freeze-through. Laying a cast-in-place or precast trough, or even the installation of the station structures cannot avert the freezing of the foundation without special measures.

The foundations of the Novosibirsk subway system stations are sandy loams or loams with a varying degree of moisture content, in which complex changes occur during through-freezing, resulting, as a rule, in an increase in soil porosity and a diminution of strength characteristics when there is a thaw. The value of the angle of viscosity decreases to a lesser degree, and bond and the modulus of deformation, to a greater degree. The more highly water-saturated the soil, the more rapidly the strength properties decline. In this sense, construction of the second phase, where the subsoil water level is close to the station foundations, requires serious attention to observation of the SNiP requirement mentioned above, particularly as a result of the need to determine the extent of the effect of exposure to frost heaving on the structure.

The loads on the station foundations are transmitted in the form of concentrated forces by the columns and walls (or just the walls in single-vaulted structures) and through the trough plates, the thickness of which is taken to be that necessary to distribute the load to tolerable values. In the subsiding soils of Novosibirsk, the reduction in the strength of through-frozen soils may, as a result of this, turn out to be more dangerous. The traditional flow charts for construction of subway system stations in foundation pits, which were compiled without taking into account the lengthy winter and the effect of exposure to low sub-zero temperatures, requires significant correction, as the experience in building the first phase has shown. In particular, under these conditions, it becomes impossible to make use of the experience of the Kharkov subway system builders with respect to year-round flowline station construction. Therefore the question of developing the technology and the organization of subway system construction using an open (construction) method under harsh climate conditions is becoming extremely critical. It has not been excluded that suitable research could reveal the need for changing the general requirements of the SNiP and permitting through-freezing of the foundations under set conditions, conducting special tests to establish the calculated characteristics for the strength of the thawing soils.

Reducing the effects of low temperatures during operation is particularly important for the bridge crosswalk, the span of which is about 2 kilometers. A decision on construction of the closed span structure design and the galleries on the bridge approaches calling for installation of special thermal curtains has been adopted and put into effect. The economic expediency of such a decision is apparent, but its operational efficiency can only be determined by practice since, on the basis of a number of parameters, there are no bridge crosswalks similar to this one.

In the current article, only the basic features and problems of the design and construction of subway systems under harsh climate conditions, which were revealed during construction of the first phase of the Novosibirsk metro, are presented. Considering that it is being proposed to continue building the subway system in Novosibirsk and to begin in a number of other cities under similar conditions, it is necessary to make a special study of this question

and work out the design and technological decisions and the standardizing bases which will insure qualitative and efficient design and construction.

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## MARITIME AND RIVER FLEETS

### BRIEFS

**VOLGA-CLASS RIVER-SEA FREIGHTER--TASS--**The launching slip of the "Krasnoye Sormovo" plant today launched a prototype Volga-class river-sea freighter. Designed by the Gorkiy designers, it is to replace the earlier, "Sormovskiy" class vessels. In comparison with these, the "Volga"-class will carry significantly more cargo--5,000 tons. Its independent sailing range will grow by a factor of 2. The new freighter will be able to operate in the winter also in seas which do not freeze over. Its reinforced hull will permit it to make its way easily through sectors with broken ice, thereby permitting the navigation season to be extended on the country's major rivers. [Text] [Moscow VODNYY TRANSPORT in Russian 6 Sep 86 p 2] 9194

**ARKHANGELSK CHANNEL DEEPENED--Arkhangelsk--**The "Severodvinskiy" drëdge deepened the bottom of the navigable arm at the mouth of the Pechora by just centimeters, but the result is thousands of tons of additional freight. Now every vessel of the Northern Shipping Company departs Arkhangelsk for the Arctic with full holds. The so-called "vegetable navigation period" is now in full swing along the Arctic route. Potatoes, vegetables and fruits are moving in a continuous flow. The produce of southern fields and gardens is being dispatched to the geologists searching for oil and gas stores in the tundra without delay. The ice delayed the opening of navigation in the port of Amderma by almost a month. In mid-September, the southern winds should drive the ice away from the shore. Therefore vegetables are temporarily moving into the tundra along the Pechora, which has been deepened. [Text] [Moscow SELSKAYA ZHIZN in Russian 12 Sep 86 p 1] 9194

**YURIY ARSHENEVSKIY LAUNCHED--**"Yuriy Arshenevskiy" is the name of the new ship launched from the slips of the "Vyartsilya" Company. This is already the third freighter in a series of vessels built on order of the USSR by Finish shipbuilders. It is intended for operation under conditions in the Far North, and it is capable of transporting national economic goods in the Arctic Ocean region without the assistance of an icebreaker with ice thicknesses greater than 1 meter. [Text] [Moscow VODNYY TRANSPORT in Russian 18 Sep 86 p 1] 9194

**FLEET INFORMATION TELEPHONE SERVICE--**It was not too long ago that it was not all that simple for family members of seamen at sea to learn where some ship or another was and when it would return to its home port. But now "Transflot" of the city of Odessa has organized an information service.

Having dialed the telephone number, within several minutes, you may now find out the country and port where the ship which interests you is situated, and the service's workers will also indicate approximately how long it will be there. [By D. Romanov] [Text] [Moscow VODNYI TRANSPORT in Russian 23 Sep 86 p 1] 9194

FIFTH NUCLEAR-POWERED ICEBREAKER--Leningrad, 24 (Sep), TASS--Today at the Baltic plant in Leningrad, construction of the hull of a new atomic icebreaker was completed. An important stage in the construction of the fifth Soviet giant to operate on nuclear energy was wrapped up. These vessels are called upon to increase the efficiency of shipments in the polar seas. The ships, in putting the comprehensive "Intensification-90" program into effect, rejuvenate production dynamically and incorporate progressive technology and original equipment and accessories. [Text] [Moscow PRAVDA in Russian 25 Sep 86 p 1] 9194

TANKER MARSHAL GELOVANI OPERATIONAL--Kherson--The tanker "Marshal Gelovani," built on commission of the Georgian Shipping Company by shipbuilders at the Kherson Shipbuilding Association, was turned over for operation. Archil Viktorovich Gelovani, after whom the ship was named, was the eminent leader of Soviet engineer troops during World War II. The new tanker is registered in the port of Batumi. Captain A. F. Shukaylo tells us that the ship is designated for transporting petroleum and petroleum products. Double sides and bottom reduce the possibility of polluting seas and oceans to a minimum. Conditions for crew rest time are wonderful: all cabins are single berth, and each has its own air conditioning system. Much of what man had to do earlier has now been taken over by automation. [By A. Guskov] [Text] [Kiev RABOCHAYA GAZETA in Russian 7 Oct 86 p 2] 9194

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